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To Mr. J. P. Morgan,
from the author, the
personal friend of Saml. Spence
Dec'r 25th 1907

THE Railroad in Education

BY
PROF. ALEX. HOGG, M. A., LL. D.

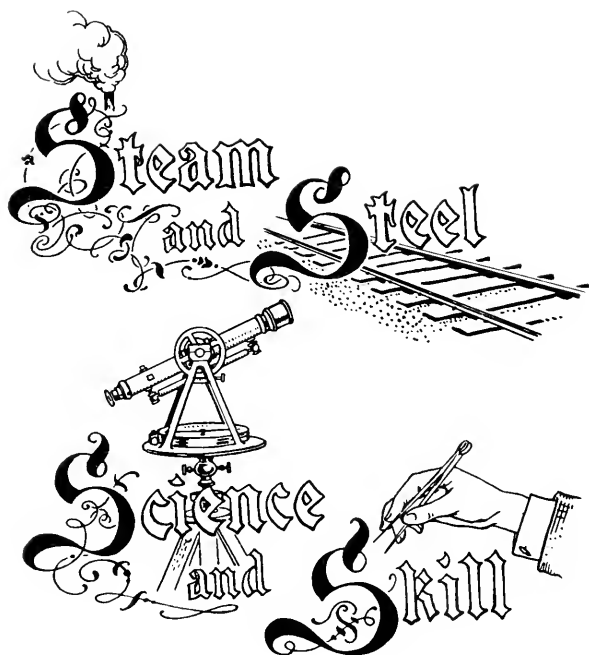
Superintendent Schools, Fort Worth, Texas

Work and Wealth are Inseparable Allies



PREPARED BY
JOHN F. MORTON AND COMPANY
LOUISVILLE, KENTUCKY

* * * 1903 * * *



ANNOUNCEMENT.

In endeavoring to keep up with the great progress of the railroad world, this, the fifteenth edition of the Railroad in Education, with new matter, new illustrations, and new type, is given to the public. Over one hundred thousand of these books have been disposed of—many copies going into the public schools of our larger cities.

ORIGINAL OBJECT. To give the evolution of steam, to chronicle the great engineering feats, to show what science and skill have done for the world; to set especially before the youth of our country what has been done for Higher Institutions of learning, what advantages have been given them by the owners and managers of the railways; to make known that these gifts have been in the line of an advanced civilization—looked to a broader patriotism as lying at the basis of a better citizenship.

PRESENT PURPOSE. --To bring about a better understanding between labor and capital—to demonstrate that the very vastness of our territory suggests the necessity of aggregations of capital—corporations; that without these it would be impossible to have so great a country, so enlightened a people.

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THE RAILROAD IN EDUCATION.

PART I.

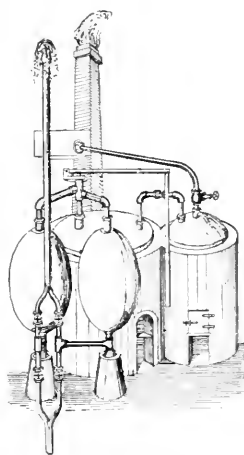
ADDRESS BEFORE THE INTERNATIONAL CONGRESS OF EDUCATORS,
WORLD'S EXPOSITION, NEW ORLEANS, 1885.



STEAM is well-born; is a lineal descendant of the four elements of the ancients—earth, air, fire, and water—has survived, lived through more than two thousand years, gaining strength from its own usefulness and age; is to-day in the full vigor of manhood. As a motive power steam was known 130 years B.C.* Hero of Egypt exhibited his Eolipile, an apparatus with a metallic boiler, provided at the top with two horizontal jet-pipes bent into the form of an S. The steam, escaping from these jets and reacting upon the air, gave a rotary motion to the pipes. Barker's centrifugal mill is an example of this kind of action.

Blasco de Garay of Barcelona, as far back as 1543, propelled with steam a vessel of two hundred tons.†

But passing over historical details—leaving out the controversies of aspiring inventors and discoverers—I come to a year in our civilization memorable for rich results.



‡ SAVARY'S ENGINE.

* *Spiritualia seu Pneumatica.*

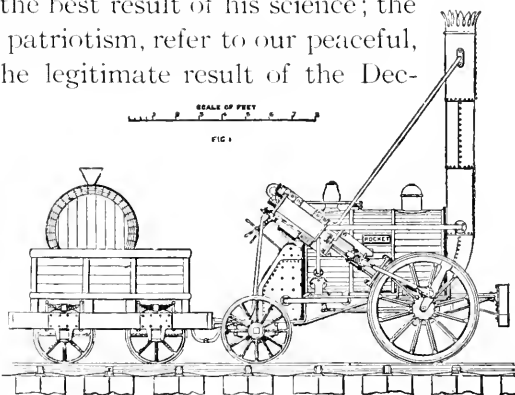
† This experiment was made on the 17th day of June, 1543, in the presence of commissioners appointed by the King, Charles V., whose report conferred the favor of the Crown on the projector. But what is unaccountable, nothing more ever came from this singular success.

‡ In 1698 Savary obtained a patent for raising water and occasioning motions to all kinds of mill work by the impellent force of fire.

In 1776, the "transmutations" of alchemy, the *ideal* of Paracelsus, gave birth to the *real* of Priestley and Lavoisier, and chemistry as a practical science is announced to the world. This same year Adam Smith published his *Wealth of Nations*. This same year the Declaration of Independence was proclaimed by the Continental Congress. This same year Watt produced—perfected—his "improved," his "successful" steam-engine.

The man of science can, with pardonable pride, exclaim, "Arithmetic fails to enumerate the 'agents' and 'reagents' of chemistry!" The political philosopher can point to the real wealth of the nations as the best result of his science; the statesman can, with true patriotism, refer to our peaceful, our happy republic as the legitimate result of the Declaration. Individuals

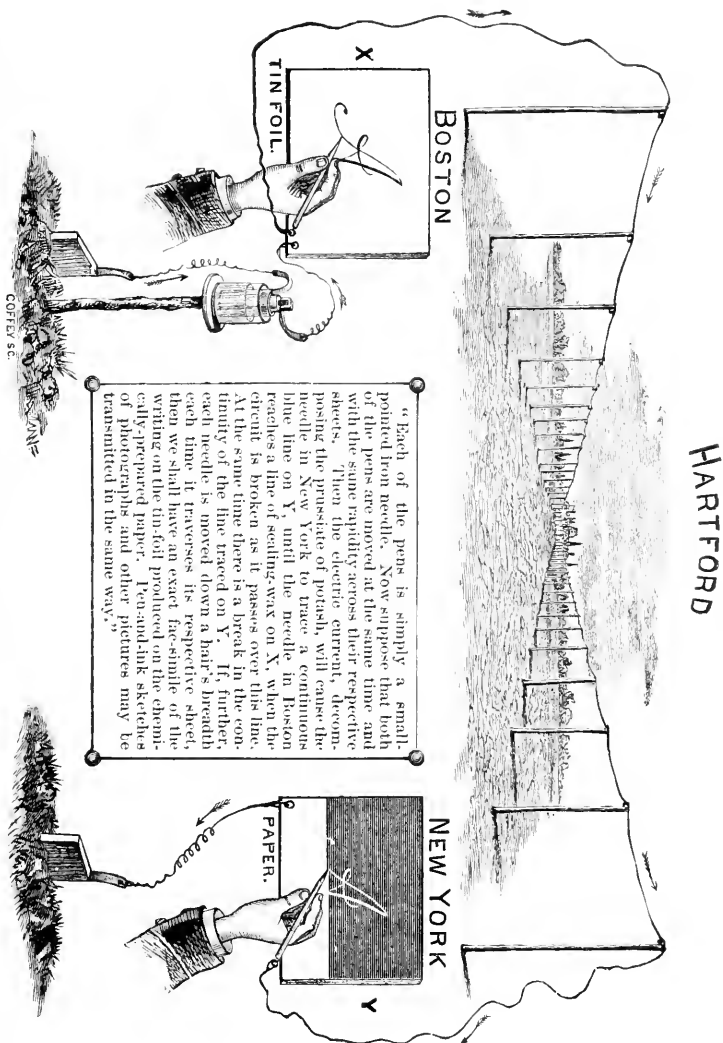
may boast of the triumphs of these, but the millions whose burthens have been lightened and lifted, who are fed and clothed by the diversified labors of steam, may be excused too—will be



THE ROCKET.

pardoned—for their appreciation of the result which gave to the world the steam-engine of James Watt. Patriotic as I am, and claiming as I do for our Fulton the first successful application of steam to navigation, in the Clermont (1807), I as cheerfully accord to the mother-country the honor due George Stephenson (1829) for his successful "run" in the Rocket over the Rainhill trial course.*

* STEPHENSON'S PREDICTION.—"I venture to tell you that I think that you will live to see the day when railways will supersede almost all other methods of conveyance in this country, when mail coaches will go by railway and railroads will become the great highways for the King and all his subjects. The time is coming when it will be cheaper for a workingman to travel on a railway than to walk on foot. I know that there are great and almost insurmountable difficulties to be encountered, but what I have said will come to pass as sure as you now hear me."



The above fulfilled. By means of the Electrophotograph, a reproduction of a photograph is now sent from New York to Chicago in five minutes.

It is a remarkable fact that within the last one hundred years science has made its most rapid strides. Steam and electricity, motor and messenger, have vied with, not rivaled, each other in *transporting* and *transmitting*, until "*there is no speech nor language where their voice is not heard. Their line is gone out through all the earth, and their words to the end of the world.*"

Classical scholars have insisted that our word "educate" is from *educere*—to draw out; and hence they have taught that education is a "pumping" process, that it is all in and within the ~~mind~~ mind of the child, the learner, and must be drawn out; and thus to their theory is due largely the one-sided instruction, or the total disregard of every other method. The truth is, our word "educate" is from a different word—it is from *educare*, which means "to bring up," "to train," "to develop," "to increase and give power to." There can be no mistake from this view, that there is a pouring-into as well as a pumping-out in the process of education.

I have no war against the classics. So far from it, I assert to-day that there can be no "liberal education" without the classics. Among these, however, I claim the first place in order and importance shall be assigned to our mother-tongue.* The Greek knew no other than his own language, nor did the Roman go abroad to study until he had mastered the Latin. Why, then, should we ignore, why should we be so slow to acknowledge, the claims of modern science?

In the demands made by the progressive development of railroad construction, and the improvement in that vast field alone, every science and every department of science is laid under contribution, until we have here the fullest and happiest illustration of the great law of "supply and demand."

*"The Roman bestowed upon the language of his country the appellation of *patrius sermo*, the paternal or father speech; but we, with a truer and tenderer appreciation of the best and purest source of linguistic instruction, name our home-born English the *mother-tongue*."

A motive power greater than that of man or horse, an improved steam engine, is called for, and James Watt presents his.* And now a locomotive is needed that shall transfer this mighty energy, adapt it to the road, and George Stephenson controls with his own hand the throttle of his own engine. And now a trestle, and now a bridge, and now a suspension bridge, and that, too, across Niagara, and the occasion—science, conscious of this new requisition—gives to the world John A. Roebling.

Harmonizing circumstances—Time, the great arbiter, comes in, and so orders it that Robert, the son of George Stephenson, should pass over Niagara River in a railway train, and on the suspension bridge, which the father had but lately declared to be an impracticable undertaking. The purpose of this great engineer's visit to this country was to make an inspection of the location for the celebrated tubular bridge at Montreal. Stephenson had criticised and condemned the suspension principle, and had approved the tubular girder for railway traffic. At that time doctors of science—engineers—differed as to their theories, but, as now, they also agreed upon the facts as exhibited in the results.

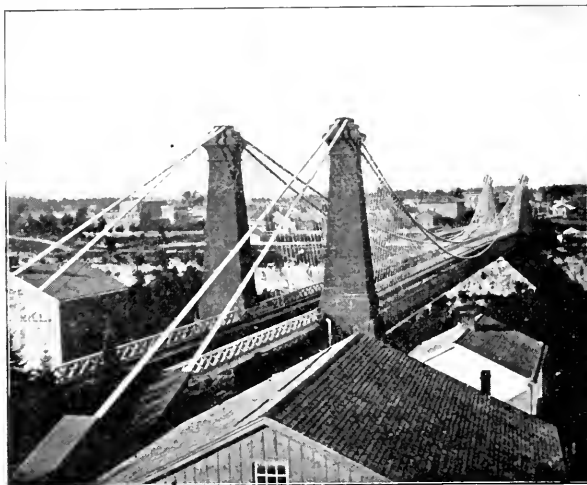
In 1874 I visited Niagara Falls, spent two days, was delighted, amazed, and awed in turn at this wonderful manifestation, this remarkable phenomenon of nature. From the Falls I went to the suspension bridge. Here stood two through express trains awaiting the signals to move on their ways, east and west. At the appointed moment they did move. Without tremor or oscillation

*The steam engine, that scarcely inanimate Titan, that living, burning mechanism, was brought nearly to its perfection by James Watt. James Watt took out his patent in 1769, that great year in which Wellington and Napoleon were born; and ages after the names of Austerlitz and Waterloo shall perish from the memory of man, the myriad hosts of intelligent labor, marshaled by the fiery champion that James Watt has placed in the field, shall gain their bloodless triumphs, not for the destruction but the service of mankind. All hail then I say to the mute, indefatigable giant! In the depths of darksome mines, along the pathways of travel and of trade, and on the mountain wave, drag, urge, heave, toil, for the service of man! No fatigue shall palsy thy herculean arm! No trampled hosts shall writhe beneath thine iron foot! No widow's heart shall pay bleeding tribute to thy beneficent victories!

EDWARD EVERETT.

that bridge sustained its accustomed load, performed its duty, as it had done thousands of times before, as it had done fifty times that very day.

When I saw this bridge spanning this angry river, supporting these heavily laden trains, I felt this inspiration; I said, "This bridge for the *creature* is equal to yon cataract for the CREATOR."



THE ORIGINAL BRIDGE.

But again, another demand—a higher principle still—a fiat had gone forth that not only shall "*Every valley be exalted, but every mountain and hill shall be made low: and the crooked shall be made straight, and the rough places plain.*" Streams, rivulets, rivers

had been bridged, the valley had been exalted; the crooked route must now be made straight, the mountain must be made low. No longer can time be consumed in searching out the passable passes, in following the tortuous gorge. The yawning chasm, the deep cañon, the treacherous glacier, the awful avalanche, snow and ice, mountain-pass and mountain-peak—all, all must be shunned



THE CANTILEVER.

—must be left to enjoy undisturbed their lofty abode amid its chilly, frozen environments. Whether Pyrenees or Alps, Alleghany or Hoosac, all ranges standing in the way of the locomotive must be made low, must be TUNNELED.

Science, quietly observing what is going on, anticipating these new and still greater demands, accordingly prepares for yet greater results, and at this juncture and for this stupendous work furnishes both the engineering skill to conduct and the new motors, Burleigh drills, and air compressors to perform the boring, and dynamite to do the blasting, and we have Mount Ceniz Tunnel, a trifle less than *eight miles* in length, thirteen and a half years building, at a cost of \$15,000,000; St. Gothard, *nine and a quarter miles*, seven and a half years building, at a cost of \$9,700,000, consuming half the time, at two thirds the cost of the Ceniz Tunnel, the reason for this—improved implements; the Hoosac Tunnel, some five miles in length, eleven years in building, costing \$13,000,000.

One among the first railroad tunnels in the United States was the Alleghany Portage double-track, nine hundred feet long, costing some \$21,840.

I must be pardoned for mentioning in this connection, that here particularly the skill of the engineer is tested in the use of the most accurate instruments and of the most celebrated makers. In boring the Mosconetcon Tunnel on the Lehigh Valley Railroad—a work less in extent than some, but said to be of as great magnitude, on account of the presence of water and other difficulties, as any of the American tunnels—the east and west headings met in December, 1874, whereupon it was found that the error in *level* and *alignment* was less than half an inch.

To be an engineer in the full and complete sense of the term embraces all sciences, pure and applied. Nor are the languages to be left out. Through the Latin we learn of Cæsar's bridge, through the Greek of Xerxes' bridge of boats (*pontoons*). That is

not a complete curriculum that would leave French and German out of the engineer's course. Our Latin teachers are very proud when their brightest scholars can translate the description of Cæsar's bridge. It is considered hard Latin; it is given as a task—not for the information about the bridge, but because of the difficulty of the translation.

Now, Mr. President, turn your countenance upward; exercise the prerogative you enjoy above the rest of the animals "*... quæ natura prona*", behold the arches that support this Grand Structure! Tell me if there is not more study, more beauty in one of these than in a whole book of Cæsar?



[The new East River Bridge, the plans of which have just been adopted by the Commission in charge of the work, will be the longest suspension bridge in the world, exceeding the present Brooklyn Bridge, however, by only four feet six inches.]

In 1883, and in this country, there has been completed and opened the greatest structure, the grandest monument to skill and science—to father and son, to John A. and Washington A. Roebling—to the former for the conception, to the latter for the construction of the Brooklyn Bridge—the longest span in the world. In the building of this highway, virtually making New York and Brooklyn one city, the entire domain of science has been laid under contribution. Every formula of mathematics, every discovery of chemistry, every law of physics, all have furnished their quota. Every department of human industry, every tool invented by the ingenuity of man, has borne its part in the final result. Without the most recent discoveries of science, the

converting of iron into steel by the pneumatic process, the bridge in its present form could not have been built. I can not describe in detail all the creative and constructive efforts of the human mind in this great work. It is not necessary; it is finished—" *Finis coronat opus.*"

All this, however, is upon but one side, the department of construction, the building of railroads.

There is still another side, the operating department, in which to accuracy of calculation must be added discretion, sound judgment, and all the higher qualities of head, and heart too. Here we learn—we take an account of exceedingly small things; here we hear the name of the nonentity, the imaginary *mill*, and use it in actual daily transactions: "So many tons a mile at so many mills per ton." "It will cost so many mills to move such freight; therefore, in order to pay dividends and cover operating expenses, we must charge so much per hundred."

The tables—operating expenses—have these items: "The amount of coal used this year compared with last on Division—— was 1.8 pounds more, or 2.3 pounds less per mile."

In what school can a pupil be found who would distribute the tax-assessment for eleven hundred miles of railway, passing through twenty-nine counties, and the miles and *hundredths* of a mile in each county to be taken into account, each county assessing a different valuation, and balance up the whole to within *five mills*, one half of one cent?

These are some of the problems and these are some of the questions that are solved by the railroad accountants.

The curse of our schools and colleges, and universities too, is the lack of accuracy. And I am not sure but the careless use of slates and blackboards has much to do with it. It is so easy to say, "Oh! that is wrong—rub it out." In railroadging you can not "rub it out."*

*You do not find slates and blackboards in the rooms of accountants.

The dispatcher who sits at his table with fifty—a hundred and fifty—trains on the rail has more responsibility every way than the general who directs an army.

“Some one had blundered,”

was said, when at Balaklava,

*“Then they rode back, but not—
Not the six hundred.”*

Some one has blundered in Egypt. Had Palmerston built a railroad from Cairo to Khartoum, there would not now be a rebel in the Soudan to annoy Gladstone.

Your World's Exposition reminds me of the Centennial (1876) at Philadelphia. The latter was full of examples—fruitful illustrations—of what accuracy and precision in railroad managements accomplish in safety to property and person. The Pennsylvania road alone gave receipts for 16,039 cars of building material—for 4,116 cars of exhibits placed within the Centennial grounds, without a single claim being made for damage. The total number of pieces of baggage received and delivered at the several stations amounted to 730,486 pieces. Of these, *twenty-six* pieces were lost, the claims for which amounted to \$1,906.99. Total number of passengers from May 10th to November 10th, 4,955,712, carried without injury to a single one. Add to this that during the year 1876 this road moved 17,064,953 tons of freight and 18,363,366 passengers without loss of life or harm to any one.

With these facts before me I am ready to believe the following: “A French statistician observes that if a person were to live continually in a railway carriage, and spend all his time in railway traveling, the chances of his dying from a railway accident would not occur until he was *nine hundred* years old.”

But the railroad is solving other problems—social problems, commercial problems, farming problems.

The poet has said:

"Seas shall join the regions they divide."

The railroad answers: And continents shall unite the oceans they separate. The rich valleys of the interior, the fertile plains of the "Far West," are made neighbors to—find markets upon—the very shores of the Atlantic, all by and through the agency of the railroad.

We hear a great deal about the Great West! Pray, what has made the West so great? Not greatness of territory solely—not great distances, but the potentiality, the living, working capacity of the locomotive—the greatest pioneer, the greatest missionary ever sent out by Church or State.

What makes Chicago the successful rival of New York? The latter is the senior of the former, not only by *scores*, but by *two hundred* years. The ten thousand miles of railway tributary to Chicago—the seven hundred trains (three hundred and fifty arriving and three hundred and fifty departing daily), with their heavily laden cars of both passengers and freight—have something to do with the prosperity, the metropolitan pretensions of the "Lake City."*

What will make your city the rival of both New York and Chicago? Not because she is the outlet of the Mississippi Basin, but because she is the eastern terminus of the railroads of the Pacific Slope, the Southwest, the Northwest.

The superintendent of our last—the tenth—census says: "The closeness with which the center of population, through such rapid westward movement as has been recorded, has clung to the parallel of 39° of latitude can not fail to be noticed." He does not, however, say a word as to the cause of this singular movement westward four hundred and fifty-seven miles in ninety years.

*To-day the number of trains entering and departing are double what they were in 1885.

Near and upon the 38°, 39°, and 40° of latitude may be found three of the great trunk railways.

But their location is still another problem. The peculiar climate, productiveness of the soil, and the early settlement of this region have all something to do with it. Here is problem growing out of problem, fruitful each to the student of social philosophy.

But again. I argue more directly because more demonstratively tangible, that the school interest, the schools themselves, have flourished and spread their influence in the direct ratio of the number of miles of railroad in the State. Massachusetts, at home and abroad, stands at the head of our school system; nor is it disputed that in her borders we find models of true culture and refinement. Massachusetts has a mile of railroad to every four square miles of territory.

This is a case from the extreme East. I take an example from what used to be termed the West, now about the middle of our country: Ohio has a mile of railroad for every six square miles of territory. Ohio has pretty good school facilities, and of late has furnished her full quota of Presidents. But select at will any State, and upon the map mark the seats of institutions of learning—schools, academies, colleges, and universities—and you will find them all arranged along the lines of the great railroads. England and Wales, Belgium, Switzerland, and Scotland possess the greatest railway facilities. These also enjoy the greatest freedom, the best systems of schools, of all the European States.

But to come still nearer. Texas is an example in which from being the largest State in the Union territorially, she has become also greater in resources than any of her sister States of the South, simply on account of the indissoluble bond between her school-lands and her railroads.

Of seventy-four cities and towns assuming control of their schools, supplementing the amount received from the State (five

dollars for each pupil of scholastic age annually) by a special tax, sixty-six of these are directly upon the lines of railways, while the remaining eight are of easy access to railroads.*

We hear a great deal about what "The Fathers of Texas" have done for the education of all the children of the State; the thousands of leagues of land reserved for the counties—the millions of acres for the general school fund. These historians should go a little further, and tell us what these "millions of acres" were worth before the railroad companies surveyed and brought these lands to the attention of the world. It is true that the railroads received sixteen sections of land for every mile of road built, conditioned, however, upon the companies surveying their own, together with the equal number of sections (*alternates*) for the schools. The entire expense of surveying and returning a double set of field notes to the General Land Office, at Austin, was borne by the respective railroads. These lands were, for the most part, hundreds of miles beyond civilization; indeed, the roads have been extended more rapidly than a paying traffic would warrant in order to develop their lands, to bring them into market.

The Texas and Pacific wore out its main line of 444 miles in building the extension west of 616 miles—was a practical example of the problem: "How far would a boy travel, starting from a basket two yards from the first egg, and carrying singly to the basket one hundred eggs, two yards apart, in a straight line?"†

But whatever develops, enhances the railroad "sections," enhances the school "alternates," until lands heretofore not commanding twenty-five cents an acre are now readily sold for two dollars; or, the railroads have increased the school funds *eight-fold*, have multiplied their values until Texas boasts of a free-school fund of *ninety-five million dollars*—a fund that will yield, at five per cent per annum, \$4,750,000.

*1902. There are now 326 districts; of these 271, or 83 per cent, are directly upon the lines of railroads.

†Some idea can be formed of the amount of *wear* and *tear* on the road, when it is understood that the boy traveled 11 miles 840 yards.

In valuation, the report of the Comptroller shows the railroads to be the third in order. Of course land and other realty hold the first place, and live stock the second. The six thousand miles of railroad in Texas, at *one half* the average cost throughout the United States, would amount to \$210,000,000.

By reference to the report of the Comptroller, it appears that the taxable property of the State was

| | |
|--------------|---------------|
| In 1872..... | \$208,508,372 |
| In 1877..... | 319,373,221 |
| In 1878..... | 303,202,426 |
| In 1879..... | 304,193,163 |
| In 1880..... | 301,470,736 |
| In 1881..... | 375,000,000 |
| In 1882..... | 419,027,476 |
| In 1883..... | 527,537,390 |
| In 1884..... | 603,060,917 |

In 1870 there were less than 300 miles of railroad in the State. From 1870 to 1877 there were added 1,300 miles; 400 miles were built in 1877, 200 in 1878, and 700 each in 1879 and 1880, while in 1881 there were built over 1,500 miles. Since 1881 there have been added by the completion of roads projected nearly one thousand miles more. It will be observed that the *gains* in the wealth of the State followed the years of greatest mileage built. Was it not dependent on the increased extension of the railroad?

I know of no better criterion by which to measure the real wealth of the State—the prosperity and progress—than by the railroad earnings. The gross earnings of the Texas roads for 1883 are put down at \$21,450,445. But this is a small item, a very small factor, compared with the real amount and value of the products themselves, when it is remembered that the freight was moved at an average cost of 1.8 cents per ton per mile; that passengers were carried for 3.5 cents per mile before the late law (3

cents) went into effect. However, passenger traffic is everywhere small as compared with freight, being in Texas less than a third of the gross earnings.

By a comparison of the average cost of moving a ton a mile in the several groups of States, it will be found that Texas roads are not exorbitant in their charges. It costs in New England 1.7 cents per ton per mile; in the Middle States *one cent* per ton; in the Southern States 1.8 cents; in the Western States 1.2 cents; in the Pacific States 2.2 cents per ton per mile. Nor is a comparison of these rates with the leading countries of Europe damaging to America. The actual cost to the companies (not what they charge for moving a ton a mile) in France is 1.7 cents; in Belgium 1.5 cents per ton per mile.

Much is heard about "The monopolies," "The soulless corporations!" I can not see where so much monopoly, so much extortion, so much discrimination comes in. That can not be very oppressive to the laboring man which transports his year's provision, for one day's labor, from Chicago to any Eastern point. That can not be a discrimination against the consumer, at least, which transports from Chicago to New York seventeen barrels of flour at the rate of one mile for *one cent*. I know of no lesson so fruitful in its teachings as the reduction in railway charges made by the railroad managements themselves from 1873 to 1879. Competition, the great law governing all trades, forced this reduction, and by which carefully prepared statistics show that these corporations lost, or there was saved to the shippers the consumers really—in the space of six years, \$992,000,000 in freights alone.

I do not wish to be understood as denying the rights of legislatures, or Congress, the regulation, as it is termed, of railroads. I simply propose to state the facts—the results in two cases. The New York Central was chartered—consolidated—in the face of determined opposition. Passenger rates were fixed by law at

two cents per mile. After the lapse now of twenty years the rate is still two cents a mile. The freight rates were left without regulation—the latter have been reduced from 3 cents per ton per mile to .83 of a cent a ton a mile; or the result of competition has lowered the rate to less than one third of the former rate.

The Texas and Pacific has reduced its freight from 3.34 cents per ton per mile (1877) to 1.76 cents in 1883, a reduction of nearly one half. Here is a fruitful study for the political mathematician—the legislative accountant.

When the legislature of Texas reduced the passenger fare from five to three cents per mile, I was met by the Hon. John Hancock, now a member of Congress from this State, and addressed thus:

"Professor, I understand you say that while the passenger gets the benefit of 40 per cent reduction, that the railroads have really lost 66 $\frac{2}{3}$ per cent. I do not see this!"

Said I: "Do you see the first?" "Yes," said he. I asked, "What part of *three* must you add to make the result five?" Said he, "Two thirds." "That is," said I, "the roads must now carry *five* passengers at three cents to realize the same that they did for carrying *three* passengers at *five* cents. Or," said I, "to be more practical, hold up your five fingers; turn *two* down—two fifths off. Now, return from *three* to five, add two, turn the same two up; *two thirds* of three this time?" "I see it," said he; "You shall have the chair of mathematics in our State university."

In this same legislative discussion another fallacy—a very grave mistake—was made by these legislative accountants. It was contended that since the New York Central carried passengers for *two* cents a mile, the Texas roads could certainly do it for three—that the reduction of the rate would more than double the amount of travel—that people would travel simply to travel!

Another comparison: The New York Central has not quite 1,000 miles of main track (953). In 1883 this road carried 10,746-925 passengers. Since a proportion is a comparison, "If 1,000 miles carry 11,276,930, how many should 6,000 miles carry?" Answer, 67,661,580; or, according to our last census, more than *forty-two* times the entire population of Texas—that is, every man, woman, and child—would have to make forty-two trips each to put the roads of Texas upon the same basis as the New York Central.

The facts show that the results of legislative restrictions have maintained *maximum* rates, while without these restrictions the tendency to lower rates has been the uniform rule.

Killing the goose that lays the golden egg is not quite the fable to which I would point our legislative regulators, but I would remind them of the story of Cadmus endeavoring to rescue his sister Europa, carried off by Jupiter, that while he destroyed the dreadful serpent, that going still further, following the advice of Minerva, he sowed the teeth of the dragon, which immediately springing up as armed men destroyed each other. Cadmus himself, however, was exempt from this terrible catastrophe.

"The discriminations," as they are termed, between local and through rates, are the same that are hourly met with between the retail and wholesale dealers in our towns as well as cities. The railroad managements "do discriminate," and always in favor of the press and the pulpit. A prominent minister of one of our leading denominations told me he had ridden free, in one year, 24,640 miles upon the various roads of Texas—over 5,000 miles being upon the lines of a single company. Hundreds of other ministers can testify to this same liberality of these same corporations toward the spread of the Gospel. The Texas roads keep a temperance lecturer continually traveling over the State, free as to transportation, to wage a ceaseless war against intemperance.

One of our greatest General Managers says: "At all times put me down, first, in favor of public free schools; second, and under all circumstances, against whisky." If temperance legislation would go as far as railroad managers, soon we would be rid of drunkenness. Gradually, slowly, if you choose, but they are coming to it. The general orders are beginning to read: "No man who uses intoxicating liquors will be retained in the employ of this company." This year orders have been issued prohibiting the use of intoxicating liquors *off* as well as *on* duty, on the whole Missouri Pacific system. It has been the standing order of the Baltimore and Ohio and other roads for years. The next step will be to prohibit the use of tobacco; a narcotic only, it is true, but to the habitual user is next in its deleterious influence to whisky. The railroads will regulate themselves—are doing it every day. There are many things about them I would like to see changed; there are many things they would change themselves, and they themselves will change them.

There is also a growing apprehension, a needless alarm upon the part of the people, as to the increasing power of the railroads. Fears are expressed that they will control the government—not for good, but for evil. The recent introduction of steam as a road motive-power (in this country not till 1830), the rapid progress of railroad construction, and the length of the lines operated—122,000 miles—the immense values that are represented, \$6,500,000,000 (*six thousand five hundred millions of dollars*), one eighth of the aggregate values of all kinds of property in the Union—all these, with the changed conditions wrought by them, have had much to do in creating this alarm. But this has reference to our own country only. The lines of railroads in the five divisions of the earth, according to Baron Kolb, cost *sixteen billions* of dollars, and will reach *eight* times around the globe. And all this has been brought about in a little over half a century.*

*The first railway worked by steam was opened between Darlington and Stockton, September 25, 1825.

If Britannia ruled the seas through her ships, why not Columbia rule the continents through her locomotives? We do not hear that the mother-country ever used her navy to oppress her own people; why fear that the daughter will use her railroads to mar her own beauty or to defeat her own greatness?

I have said, "The railroad is solving commercial and social problems—is the greatest pioneer, the greatest missionary ever sent out by Church or State." Have I not fully sustained these positions?

In 1880 I said to *The National Teachers' Association*, a body of thinkers not surpassed in this or any other country: "I believe the whistle of the Texas and Pacific locomotives will carry our civilization, our enterprise, our religion, and our language into the rocky Sierra Nevadas, until not only Mexico, but from the Lakes to the Gulf, and from ocean to ocean, will be ours, and that, too, without a battle-flag."

During the past three years the American railroad has been pushing on, is invading quietly, peacefully, successfully, the capital of the Montezumas. The commission proposed by a member of Congress from Texas, only a year ago, "To cultivate amicable and commercial relations with the countries in Central and South America," is actively about its mission of Peace—Good Will. The time is not far distant—"it is only a question of time"—when we shall realize the grand conception of Columbus, a passage to the East Indies by sailing west—indeed much more than Columbus ever dreamed of—for the American railroad builders, extending their efforts, pushing their lines south, and north, into Central, into South America, into Alaska, crossing Bering Strait (only fifty-six miles wide) in a steamer, will thus connect by a continuous and unbroken highway all the continents; will bind, will unite by this great commercial artery the interests of Chili and Brazil with Japan and China, New York, San Francisco and Yukon with Moscow and St. Petersburg.

steel, have enabled this people to subdue, to possess the earth this side the Atlantic. He does not tell us that the echoes and re-echoes of the steam-whistle were not heard resounding through the corridors of the Alps till late this century!

Mr. Webster was a great admirer of the mother-country, especially of her territorial acquisitions, her military glory, and in one of his grandest and loftiest flights of imagination, describing the progress and prowess, the greatness and extent, of the British nation, said: "It is a power which has dotted the face of the whole globe all over with her possessions and military posts, whose morning drum-beat, following the sun and keeping company with the hours, circles the earth daily with one continuous and unbroken strain of the martial airs of England."

It delights me—it thrills me—to think upon my country, my people, and my language! Could the immortals, could Jefferson, the "author of the Declaration," could Washington, "the father of his country," look out from their celestial abode, they would behold to-day our FREE REPUBLIC (stretching through more than one hundred and eighty degrees of longitude), all dotted over with school-houses and colleges and churches, whose rising-bells and morning prayer-calls and evening hymns, following the sun in his course and keeping company with the hours, fill the air daily with the merry laugh and joyous shout and happy song of a continuous and unbroken continent of ENGLISH-SPEAKING PEOPLE!

The solution? The White Sails of Commerce brought this blue-eyed, fair-skinned, light-haired race to our shores, the Locomotive carried into the interior the messengers of peace, and in their tracks followed smiling Plenty, with her attendant hand-maids, Religious Liberty, Political Freedom, and Universal Education.

I address to-day scientific men of the leading nations of earth. You can bear witness of your efforts, your resolutions, your arguments, your logic, your reasons to secure standard time.

You can truly testify, too, with some mortification, that all your labors have been futile. Yet, you have learned. I tell you that on the 18th day of November, 1883, the clocks of 20,000 railroad offices, and the watches of 300,000 employes, were reset—the minute and second hands all pointing to the same division on the *dial*—that the people who did the same could have been reckoned by millions; and that all this was accomplished without delay to commerce or injury to person. No general, from Napoleon down, could have made such a change, even in a single army corps, without the loss of property and life too.

Again, who have been foremost in building churches, schools, and colleges, in endowing universities, and in contributing to the advancement of liberal, higher education? Where can it be so truthfully said, “charity never faileth,” as among railroad men? Who ever knew a real case of charity turned from office, home, or tent of a railroad man?

Charity: *“‘Tis mightiest in the mightiest.”*

America’s great Triumvirate in action, in the successful completion, control, and management of the three great trunk railways of our country, abounded in good works, in large beneficence, and

“Their deeds do follow them.”

In addition to many smaller, but no less valuable charities, Col. Thos. A. Scott, just before his death, gave the following amounts to the following institutions:

| | |
|---|-----------|
| To Jefferson Medical College, of Philadelphia | \$50,000 |
| To the Orthopædic Hospital, of Philadelphia | 30,000 |
| To Children’s Department of Episcopal Hospital, of Philadelphia | 20,000 |
| To University of Pennsylvania, of Philadelphia | 50,000 |
| To Washington and Lee University, of Virginia | 50,000 |
| Total | \$200,000 |

In regard to the numerous gifts of father and son—the Vanderbilts—I do not know how better to present the same than by giving the letter of the Chancellor of Vanderbilt University, Bishop H. N. McTyeire:

NASHVILLE, TENN., January 29, 1885.

MY DEAR PROFESSOR:

I thank you for your letter. . . . Mr. Cornelius (Commodore) Vanderbilt gave this University one million of dollars. Of that sum we have now as invested endowment, bearing seven per cent per annum, \$600,000. His son, Mr. Wm. H. Vanderbilt, since his father's death, has given to Vanderbilt University \$250,000; and a \$100,000 of this sum has been added to our endowment. Generous benefactors to the South and to general education!

The location of Vanderbilt University has made Nashville what they call "The Athens of the South." Others have come here since.

I believe our catalogue this year will show students from twenty States and Territories, all accessible to *railroads*.

In honor of our donors we give marked attention to civil engineering, including the theoretical and practical knowledge of building *railroads*. We believe in railroads with good cause.

For mounting and equipping the observatory for the Leander McCormick telescope Mr. Wm. H. Vanderbilt gave \$25,000 to the Virginia University. Last year he gave \$500,000 to the College of Physicians and Surgeons, of the city of New York. These two, father and son, gave for the purposes enumerated, *one million five hundred and twenty-five thousand dollars*.

But additionally, and in purpose and result too—a greater gift still—Mr. Wm. H. Vanderbilt has given \$150,000 to establish at Washington a Museum of Patriotism, where the collections, the offerings and trophies, the honors paid General Grant by the nations of the earth are to be perpetually preserved for the inspection and admiration of all American youth, and that through all future generations. Or in the aggregate, Mr. Wm. H. Vanderbilt alone has contributed to schools of science, schools of medicine, and a school of patriotism, *nine hundred and twenty-five thousand dollars*.

*He is still in the prime of life, full of vigor, abounding in good deeds, and it may reasonably be expected that he will yet outstrip his father's great work, the founding and equipping of the Vanderbilt University

Col. John W. Garrett leaves the following, greater than either of his associates in extent and in security of investment. These annuities represent a basis of over a *million dollars* (\$1,100,000) at six and five per cent.

The clauses of the will pertaining to these gifts and their purposes seem to be worthy of reprinting, even in so short an address as this:

And upon the further trust that my said trustees shall, from the stocks and bonds belonging to my estate, select such good interest-bearing securities as shall amount to the sum of one hundred thousand dollars, or in their option invest the sum of one hundred thousand dollars of the moneys belonging to my estate in such manner as to produce the yearly sum of six thousand dollars, which said sum I desire shall be paid yearly to aid in improving the condition of the poor in the city of Baltimore, the first payment to be made at the expiration of one year from my death, and to continue thereafter in perpetuity; and as I have a very favorable opinion of the usefulness and effectiveness of the present organization or body corporate known as the "Baltimore Association for the Improvement of the Condition of the Poor," I recommend my said trustees, so long as in their judgment this charitable institution is efficiently managed, to give said sum of six thousand dollars to the said association annually for the purposes aforesaid; and if at any future period, in the judgment of my said trustees, said sum of six thousand dollars per year can be applied or distributed so as to confer greater benefit upon the poor of Baltimore, in that event I direct my said trustees so in their discretion to apply said sum.

And upon the further trust out of the net income of any estate to devote the sum of fifty thousand dollars annually to such objects of benevolence, to educational purposes, to aid virtuous and struggling persons, and to such works of public utility as are calculated to promote the happiness, usefulness, and progress of society; said amount of fifty thousand dollars per annum to be apportioned to the furtherance of such objects and to the accomplishment of such ends in the judgment and at the discretion of my trustees, it is my will, and I so direct, that the contributions to the purposes named in this clause shall continue during the lifetime of my children, Robert Garrett, Thomas Harrison Garrett, and Mary Elizabeth Garrett, and of the survivors and survivor of them, and that the same shall be continued thereafter by their heirs if the condition of the estate will then justify the said appropriation. I desire that the contributions and assistance to be given under this clause of my will shall, as far as practi-

*See page 35.

cable, be devoted to the promotion of the objects herein named in the city of Baltimore and in the State of Maryland; but in case of special suffering or distress in other communities, my trustees shall have the power to use their discretion and judgment in relieving the same.

From a personal friend to the two benefactors I learn that Mr. Garrett really directed the gifts of Mr. Johns Hopkins. Mr. Garrett is reported as having said: "Johns, give while you live, so that you may direct and see the fruits of your labors." Johns did give while living, and the Johns Hopkins University is the result of the accumulated efforts of Mr. Hopkins, much of this being "the earnings" of his stock in the Baltimore and Ohio Railroad. The latter road during the lifetime of Mr. Garrett was proverbial for the care of its employes. The Baltimore and Ohio Relief Association, furnishing all the advantages of a mutual life insurance company, a savings bank, and a building association, was peculiarly the result of Mr. Garrett's forethought, and the pride of his administration.

The company has announced the organization of a School of Technology for the training of young men—the future employes of the company. This school, located at Mount Clare (Baltimore) will be formally opened September next. The object and the purpose of this institution will be to give the Baltimore and Ohio a force of trained men, those having the advantages of a suitable amount of literary instruction as well as that practical teaching which they will most need.*

I must add here, for the sentiment, for the lofty and manly and elevating spirit of the donor, the following. Said Mr. George I. Seney: "If any one asks you why I have given so much money to the Wesleyan Female College of Georgia, tell them it was to honor my mother, to whom, under God, I owe more than to all the world besides." Mr. Seney gave to the Wesleyan Female College and to Emory College of Georgia, \$450,000.†

* See page 37.

† See page 38.

Mrs. Leland Stanford, since the spirit of her dear boy has departed (*abiit non periit*), has organized in the city of San Francisco four kindergarten schools, locating them in those portions of the city most destitute; and has dedicated them to the motherless and homeless little ones of her great and lowly, her splendid and yet shadowy city. Already has this benefactress, if not repaid, been compensated in her affliction for her loss. A mother writes her: "My children shall be taught to love Leland's memory, follow his example, and imitate his lovely character."

The ex-Governor, it is said, contemplates has determined—that Palo Alto, "the beautiful, sweet Palo Alto," of the boy, shall be the site of Leland's University. Those who know the father, his liberal culture, his broad views, and his entire acquaintance with all the educational systems and institutions of learning at home and abroad, being a personal friend of many of the savants of Europe, with an abundance of means at his command, feel that this will be a real university, surpassing the English universities and leading those on the Continent, since it will deal with the practical, living issues of all science, social, political, and physical. There will be, too, a liberality toward the distinguished scholars called to these appointments—their services in their specialties will be *specially* rewarded. The man who pays the trainers of his horses more at present in wages and perquisites than his State University pays her professors will evidently pay to the conductors of the various departments of this university, founded and named to honor his only child, salaries commensurate with the founder's appreciation of mind over matter.*

Mr. President, I have seen much of this Continent, have seen more of Texas. That which in our school geographies was called "The American Desert"—later, "The Staked Plains"—is no desert at all. Since the building of the Texas and Pacific this vast area has become (was all the time) fertile. All the cereals grow luxuriantly. Pure water, and in abundance, is found

*See page 39.

throughout these plains, costs but the digging of a shallow well. Here, sir, is so happily, so truthfully verified the great promise, that not only "*The wilderness and solitary places shall be glad for them*" (the railroads), but "*The desert shall rejoice and blossom as the rose,*" that I venture to suggest—I assert—Africa is not Africa because it is the home of the colored man; but the colored man is the colored man because his home is in Africa! Needs but the touch of Ithuriel's spear, the life-giving breath, the awakening influences of the locomotive, and this "Dark Continent," this land of Ham, will take its rightful place in the brotherhood of Shem and Japheth, all then being of one speech and one language, and *that* the Anglo-Saxon.

But, sir, I must close, and yet I can not do so without adding one other reflection. A few days ago, standing upon the track of the Texas and Pacific, and turning my eyes east and west, surveying its long line of 1,487 miles traversing the most fertile portions of the territory of Texas, connecting the waters of each ocean, I was forced to the conviction that, for many miles on either side, there will be presented a phenomenon not unlike the Gulf Stream, except that the warm waters of the latter will be replaced by the warm hearts of an intelligent, enterprising, and thrifty population. Some will select the fertile prairies, others will dwell amid the Sierras in search of the rich placers, while others still will be content to tend their flocks and count their herds. Of these and those who shall come after them there will be an unbroken (life-blood) current from the Pacific to the Atlantic and from the Atlantic to the Pacific, for this will truly be the highway of nations.

Sir, it is said that the ancients never worshiped the setting sun. This is more than true of our own modern devotees. Still it would be remissness, indeed, upon my part, to close this address without asking the question, to whose statesmanship, to whose forethought, to whose prophetic ken was due this gigantic enter-

prise, this girdling the continent, uniting ocean with ocean? Moving west, still west, and yet still west, pausing in front and at the very base of rugged and awe-crowned Sierra Blanca, said I: "A hundred thousand years hast thou stood sentinel over this vast valley and plain—long hast thou guarded this Pass; mayst thou yet stand a thousand thousand years, witnessing daily the transformations, 'the sweet influences,' of the peaceful locomotive, and adding perpetually thy testimony to the sagacity of the originator of the project 'to build a railroad on or near the thirty-second parallel of latitude.'"

Monuments and mausoleums, bronze and brass, may fitly commemorate the dead deeds of dead heroes, so styled by the world, amid the glare and glitter, the flush and flurry of the battlefield, but the long lines of this road, stretching across this united continent, bearing the trains heavily freighted with the rich returns of honest toil, will ever be the most appropriate monument to the wisdom and skill of the builders and present managers—while perennially the flower-decked prairie will add its fragrance to and forever embalm the memory of Thomas A. Scott, the projector of the Texas and Pacific Railway.



THE TEXAS AND PACIFIC STATION, FORT WORTH.

PART II.

REDUCTION OF RATES—INCREASED MILEAGE—GIFTS (1888).

Since the delivery and the publication (1885) of the original address, many changes have taken place—important economical results have been reached—beneficial to the country, because cheapening the cost of transportation.

Says Mr. Edward Atkinson:

The New York Central and Hudson River Railroad may be taken as a good example of an important line of railroad under most efficient management, and as a standard of what all other lines may accomplish when the magnitude of their traffic will permit them to make as great a reduction in rates. The average charge per ton per mile on this line from 1865 to 1868, four years, was 3.0097 cents per ton per mile. From 1882 to 1885, four years, the charge was 0.7895. Difference 2.2202 cents.

If we may assume that the people of the United States have been saved two and one fifth cents per ton per mile on the whole railway traffic of the last four years, either from the construction of railways where none before existed, or by such a reduction in the charge for their service, the amount of money's worth saved in four years has been \$3,898,373,159, which sum would probably equal the cash cost of all the railways built in the United States since 1865, to which sum may probably be added the entire payment upon the national debt since 1865.

Or, these conditions fulfilled, there has been enough saved in transportation alone in the short space of four years to give every man, woman, and child in the United States \$77.70 apiece. But to what is this great reduction due? How has this revolution on freight charges been brought about? Simply by the invariable and consistent law of commerce, a *non*-commissioned regulation.

During the years 1885 and 1886 there was added to the mileage of Texas nearly an equal amount each year, aggregating 1,234 miles, or swelling the total railway system, beginning 1887, to 7,234 miles; placing Texas as the sixth State in the Union in

regard to railroads. Illinois, Iowa, Pennsylvania, New York, and Ohio, in this grouping, lie immediately above her, Illinois being the highest, with 9,579 miles.*

This year, 1887, gives evidence so far of being a year of greater activity than either of the preceding, and hence an increased taxable value largely over 1886 may be confidently anticipated.† Texas should have for her full development double the present mileage; indeed, to put her upon the same footing as Illinois, she should have over 40,000 miles—should have really 44,444.

Illinois has at present a mile of railroad to every 321 inhabitants; Texas a mile to every 277. But the area of Texas—the territory to be traversed—is *five times* as great as that of Illinois.

DEATH OF MR. WM. H. VANDERBILT.

Contrary to our then reasonable expectations, Mr. Wm. H. Vanderbilt, on the 8th of December, 1885, was stricken down, really “in the prime of life” and “full of vigor.”

The shock with which his immediate friends received the news of his death is the best evidence of how unexpected it was, while the tribute of these same friends closely associated with him is given as the best exponent of the life and character of the man.

His sudden death, in the very midst of the activities whose influence reached over the continent, has startled the whole country, and in the hush of strife and passions the press and public give tender sympathy to the bereaved family, and pay just and deserving tribute to his memory. But to us who were his associates and friends, endeared to him by the strongest ties and years of intimacy, the event is an appalling calamity, full of sorrow and the profoundest sense of personal loss; while officially we feel that his sagacity, his strong common sense, his thorough knowledge of the business, his willingness to lend his vast resources in times of peril, and his counsel and assistance were of invaluable and incalculable service in conducting and sustaining these great enterprises.

*Illinois and Pennsylvania still leading, Texas is now the third State in the Union, with a mileage of 10,617, giving direct employment to 48,000, thus feeding and clothing 240,000 of her citizens; while the railroads of the United States provide for and take care of over 5,000,000 of the entire population.

†Taxable values, 1887, \$650,412,401; for this year, 1902, \$1,017,571,732.

He came into the possession of the largest estate ever devised to a single individual, and has administered the great trust with modesty, without arrogance, and with generosity. He never used his riches as a means of oppression, or to destroy or injure the enterprises or business of others, but it constantly flowed into the enlargement of old and the construction and development of new works, semi-public in their character, which opened new avenues of local and national wealth, and gave opportunity and employment directly and indirectly to millions of people. To the employes of his railroads he was exacting in discipline and the performance of duty. He was merciless to negligence or bad habits in a vocation where millions of lives were dependent upon alertness and fidelity. But within these limits he was a just and generous employer and superior officer. He knew how to reward faithfulness and remember good conduct, and always held the respect and allegiance of the vast bodies of men who called him chief. With all the temptations which surround unlimited wealth his home-life was simple, and no happier domestic circle could anywhere be found. The loved companion with whom he began his active life in the first dawn of his manhood was his help, comfort, and happiness through all his career, and his children have one and all honored their father and their mother, and taken the places which they worthily fill in their several spheres of activity and usefulness.

As an evidence of the direction given by the example of the family, grandfather and father, we find the following, and in behalf of and for the benefit of the same employes, that a social school, with halls and libraries and even home comforts, is provided by CORNELIUS:

As an outgrowth of this work of the Young Men's Christian Association, and because of the felt need of larger and better accommodations, Mr. Vanderbilt, on the 30th of June, made a proposition to the Board of Directors of the New York Central Railroad, that if they would set apart a plot of land eighty by forty feet, on the corner of Forty-fifth Street and Madison Avenue, as a site for a building to be used by the railroad men centering at the Grand Central Depot, he would at his own expense erect thereon a magnificent building, adapted in all respects to the growing demands of the work of the society, with whose progress and development he was so familiar.

The proposition was accepted on behalf of the company in an appropriate and characteristic letter by President Depew, who said, among other things:

Individually I am deeply sensible that this work will lighten the burdens of the administration of the affairs of the company, and promote that good feeling and mutual and interdependent interest between the executive and all departments of our business, which, increasing with years, will furnish more acceptable service to the public and add to the value of the property.

Ground was broken for the new building September 1, 1886. When finished it will contain, on the first floor, reception-room, offices, and committee rooms, reading-room and library containing 7,000 volumes, and a room for games. In the basement will be located the gymnasium and bowling alleys, bath-rooms of the most modern kind, including a large plunge, and a boiler for heating the building. The second floor will be devoted to the large hall for lectures, concerts, and other entertainments, and will contain rooms for classes. On the third floor quarters will be provided for the janitor, while in the upper story provision will be made for men to sleep who occasionally remain in the city over night. The building will be of brick, trimmed with terra cotta, and the interior finished in the most handsome and modern style.

Turning from the provision completed for the comforts of the working classes, and of his employment, Mr. Vanderbilt contributes to the promotion of taste and a love of the fine arts, presenting to the Metropolitan Museum of Art, in New York City, the painting by Rosa Bonheur, entitled "The Horse Fair," purchased at the sale of the Stewart collection at a cost of \$53,000. His reason for this presentation is best given in his own words:

It seems to me to be a work of art which should be in a position where it can permanently be accessible to the public. In the gallery of the Museum this object will be attained.

An appreciative public, as these facts become known, must forget the millionaire in their admiration of the man.

MR. ROBERT GARRETT.

Has it not been established that good deeds are hereditary—are transmitted from father to son? The school established at Mount Clare, at a cost to the Baltimore and Ohio of \$25,000, has been by the company voted an annual appropriation for its support of \$20,000.

Soon this, for the employes, is followed by a gift of \$8,000 by the President, Mr. Robert Garrett, to "The New Art Museum" of Princeton College.

Thus again is exhibited the broad philanthropy of the benefactor, suitably contributing to the needs of one, as well as to the tastes of another class of persons.

SENATOR JOSEPH E. BROWN.

While Mr. Seney was making an outright gift of \$450,000 to Emory and the Wesleyan Female College, (ex-Governor) Senator Joseph E. Brown, the President of the Western and Atlantic Railroad, was purchasing in the market bonds of the State of Georgia belonging to the University, in order to establish a perpetual fund to aid in educating indigent young men, by a loan on certain easy conditions. The number benefited now, from twenty to twenty-five, will increase annually.

This is not a donation; the beneficiaries agree to pay back the amount received with 4 per cent interest, the main idea being to help those who make an effort to help themselves. The original fund was \$50,000, bearing seven per cent interest.

This gift, or loan rather, is known as "The Charles McDonald Brown Scholarship Fund." The real object and scope of this fund is best given in the language of the sagacious donor:

The object is to help indigent young men who are poor and promising and who are not able to help themselves, and who have not friends able to help them. The terms of the donation do not permit any young man to receive more than two hundred dollars per annum for his expenses while at college. The tuition is free, and where a young man has one hundred dollars per annum, or can command that, he is permitted to have an additional hundred to help out and enable him to finish his education when he could not otherwise do it.

The same is true, whether the amount he can furnish be more or less than one hundred dollars, as he would be allowed to receive the benefit of the fund to the extent of the balance necessary to make up the two hundred dollars per annum. The object here, as they are poor boys, is not to put it in their reach to be extravagant, but to compel them to get along on two hundred dollars a year, their tuition being free, which they can do and live comfortably.

Provision is made for a system of competitive examinations, where they can be had, which are reported from the different counties, and upon these reports the trustees of the University make up their decision as to who is most entitled.

Within less than a half century the rich fruits of this scholarship will be observed in the field and forum, in the workshop and in the counting-house, in all the peaceful, productive walks of life of the great Empire State of Georgia.

THE BEGINNING OF THE STANFORD UNIVERSITY.

"His liberal culture, his broad views, and an abundance of means at his command," have enabled the Governor to name a Board of Control for "Leland's University."* Thirty millions of property has been designated as the foundation of this school.

The design of it is truly to "deal with the practical living issues of all science—social, political, and physical." Article I of the grant sets forth:

The Nature, Object, and Purposes of the Institution hereby founded to be:

Its nature: That of a University, with such seminaries of learning as shall make it of the highest grade, including mechanical institutes, museums, galleries of art, laboratories and conservatories, together with all things necessary for the study of agriculture in all its branches, and for mechanical training, and the studies and exercises directed to the cultivation and enlargement of the mind.

Its object: To qualify its students for personal success and direct usefulness in life.

And its purposes: To promote the public welfare by exercising an influence in behalf of humanity and civilization, teaching the blessings of liberty regulated by law, and inculcating love and reverence for the great principles of government as derived from the inalienable rights of man to life, liberty, and the pursuit of happiness.

ARTICLE IV.

POWERS AND DUTIES OF THE TRUSTEES.

SECTION 9. To appoint a President of the University, who shall not be one of thier number, and to remove him at will.

SEC. 10. To employ professors and teachers at the University.

SEC. 11. To fix the salaries of the president, professors, and teachers, and to fix them at such rates as will secure to the University the services of men of the very highest attainment.

* Refer to page 31.

SEC. 14. To prohibit sectarian instruction, but to have taught in the University the immortality of the soul, the existence of an all-wise and benevolent Creator, and that obedience to his laws is the highest duty of man.

Do not these quotations justify the prediction of 1885: "There will be, too, a liberality toward the distinguished scholars called to these appointments—their services in their specialties will be *specially* rewarded. The man who pays the trainers of his horses more at present in wages and perquisites than his State University pays her professors will evidently pay to the conductors of the various departments of this University, founded and named to honor his only child, salaries commensurate with the founder's appreciation of mind over matter."

One other remarkable fact about this grant—that while our endowments for colleges and universities have been usually the gifts of either a man or woman singly—this is the joint grant of:

We, Leland Stanford and Jane Lathrop Stanford, husband and wife, grantors, desiring to promote the public welfare by founding, endowing, and having maintained upon our estate, known as the Palo Alto Farm, etc.

The foundations have been laid:

MENLO PARK, CAL., May 15th.—The corner-stone of the first building of the Leland Stanford, jr., University was laid this morning at Palo Alto.

June 20, 1896, Senator Leland Stanford passed away. He was spared, however, to see his University inaugurated, to utter on the opening day: "The beneficence of the Creator toward man on earth and the possibilities of Humanity are one and the same. . . . The humanizing influences come from a proper understanding of the rights of man and his duties to his Creator. We believe that a wise system of education will develop a future civilization as much in advance of that of the present as ours is in advance of the savage. We may always advance toward the infinite. The children of California shall be our children. It is our hope to found a University where all may have a chance to secure an education such as we intended our son should have."

PART III.

WORK AND WEALTH—INTERSTATE COMMERCE BILL.

These are not the same—they are not “equals”—they are mathematical “equivalents.”

Work is the cause, wealth the result—work the instrument, wealth the effect—work the procuring agent, wealth the accumulated product:

“As unto the bow the cord is,”

So is work unto wealth,

“Useless each without the other.”

And while by no amount of discussion can work and wealth be shown to be the same, it is equally true, however, that there must be peace—harmony between them. Work is most effective, most productive when it is “sustained” and “protected” by wealth.

This position presupposes organization, and there is as much reason for organization among working men as among moneyed men—but this organization must be in the direction of doing, not in the prevention of doing.

Hence “the strike” is wrong in theory and doubly so in practice. In practice it not only requires the withdrawal of certain individuals from work, but prevents others from working. While it may not be so easy to establish the position that no one has a right, in health, to quit work, it can easily be shown that the prevention of others is clearly wrong, and a direct interference with personal liberty.

The remedy for these troubles can not be discussed here. The want of harmony, of entire cordiality between work and wealth, has had its origin of late in this country in the results of the Civil War.

Prices of everything, for whatever purpose, became fabulously high during the war. The demand was far greater than the supply. The war ended and a return to normal conditions, not suddenly even, but a tendency continually in this direction, wrought a change in the demands. The increased and increasing number of workingmen, with a less and less demand for them, even at lower wages, has brought about a feeling of unrest—a spirit of discontent. The idea has become prevalent that the poor (the workingman) has become poorer, because he gets less for the same work, forgetting the fact that he can purchase more with the same amount of money; that the rich (wealthy man) has become richer, which again is not the fact. It is only an aggregation of the riches, wealth of many men, controlled, it may be, by one man.

And as the railroad corporations seem to have gotten this control in long lines, accumulated wealth, they have been attacked as the common enemy of the poor man.

It is true these lines have been lengthened, and these corporations have become larger, and immense amounts of money have been *invested* in them, not realized or made by them—so much that they have attracted the criticisms and provoked the envy of the discontented, receiving at the same time the denunciations of a large number of people who ought to know the actual situation.

As compared with other aggregations of wealth the railroad should be ranked high, and the accumulation of vast properties, franchises, and even privileges should be readily conceded to these corporations. For the whole economy of nature and art is comprised under these three heads: Transmutation, Transformation, and Transportation.

The former is chemical, the second mechanical, and the third, that which deals with the products ready for the use of man, comes under and justly belongs to the transporting power, whether by sail or steam, whether on water or land.



TRANSMUTATION.

“hoarded” but for them. This is especially true of the South; railroads have been built far in advance of the demand for them, and years must reach even an ex-“dividend-declar- penetrated far into tions in order to proach of the com- same railroads, all are boring for wa- the fact, or putting beyond experiment the question that an abundance of the purest water can be obtained all across what have heretofore been reckoned barren plains. These railroads are doing all this for the benefit of the new citizen, who with his small means can not afford to incur the expense of such investigation.



TRANSFORMATION.

There is a strange inconsistency in the action of the men who are without railroads and those who have them. The former work for their location, talk for them, and even pay money in subsidy to secure them; the latter abuse them as monopolies, as oppressors of the poor.



TRANSPORTATION.

There never has been a field in which the poor man (the workman) has had such a chance to come to the front as in the building, the equipping, and the managing of railroads. Neither the forum, nor the legislative hall, nor the battlefield has ever offered such opportunities to men, whose energies have been directed by their brains, as the railway service.

On page 19 of the original address occurs the following: "That can not be very oppressive to the laboring man which transports his year's provisions, for one day's labor, from Chicago to any Eastern point. That can not be a discrimination against the consumer, at least, which transports from Chicago to New York seventeen barrels of flour at the rate of one mile for *one cent*."

The following comparisons are worthy of attention:

Flour into Bread.—A \$7-barrel of flour will make one hundred and eighty loaves of bread. At ten cents a loaf, the estimated cost of converting this barrel of flour into one hundred and eighty loaves of bread is \$3, showing a net profit of \$8. Total charge by railroad for transporting that barrel of flour from St. Louis to New York, 40 cents.

Or the retail dealer received twenty times as much for his little manipulations as does the railroad that transports it 1,000 miles. The receiving and delivering both being an extra expense to the railroad.

Beef.—Good beef that costs about 9 cents per pound retails at 16 cents, a profit of over 75 per cent.

Fresh beef is transported from the Western market, say Chicago to New York or Boston, for 40 cents per 100 pounds, or less than a half cent a pound. Should the consumer complain of this?

Hams.—The average rate of freight on hams is, say 20 cents per hundred weight; the average weight of hams about 12 pounds, or eight hams per hundred weight. That is, the freight on eight hams is about 20 cents; on a single ham, one eighth of that, or $2\frac{1}{2}$ cents; gross charge by railroads, $2\frac{1}{2}$ cents on the whole ham,

against a profit of 4 or 5 cents on a single pound paid by the consumer. Or the freight from the Western to the Eastern cities is about *one sixtieth* of the cost of the ham.

Tea.—The average cost of tea to the consumer is 80 cents per pound. Average profit 30 cents per pound. Freight charged by the railroads for carrying this tea 1,000 miles is 45 cents per hundred weight; the profit on a *single pound* exacted from the consumer is two thirds of the gross charge by railroad for carrying 100 pounds 1,000 miles.

Boots and Shoes.—The profit on a single pair of \$4 boots or shoes is equal to three times the freight charges on a dozen or even twenty pairs for 1,000 miles.

Clothing.—A good suit of clothes can be bought for \$20. Weight of suit five pounds. Maximum rate for carrying this class of goods to Chicago, St. Louis, and Western points from New York, say 1,000 miles, 50 cents per hundred weight.

This suit weighs 5 pounds, 20 suits weigh 100 pounds, transportation 1,000 miles 50 cents, 2½ cents each; average profit per suit to the dealer \$8. Profit to dealers 320 times the transportation.

And yet nobody complains of these profits. No regulation is discussed, no "Interstate Commerce Bill" is passed to prevent these discriminations, these monopolies. The regulation of these is left to the laws of trade—to competition, and in which the "shorter" the "haul," the larger and the "longer" this profit is exacted of the consumer, the workingman.

THE INTERSTATE COMMERCE BILL.

The constitutional authority upon which this is based reads:

ARTICLE I, Section 8, Clause 3: The Congress shall have power to regulate commerce with foreign nations, and among the several States and with the Indian tribes

This constitution was adopted in 1787, or one hundred years ago, twenty-nine years before the first canal, thirty-two years before the first steamship crossed the Atlantic, twenty years before the Clermont ascended the Hudson, and forty-two years before a railroad, even of the rudest equipment, was constructed in this country, and hence could not have been designed to control the present railroads, or even regulate the commerce transported by them. Section 9, clause 5, of the Constitution clearly sustains this interpretation, viz., that our present Constitution never so much as anticipated railroads or their management by Congressional enactment :

No tax or duty shall be laid on articles exported from any State. No preference shall be given by any regulation of commerce or revenue to the ports of one State over those of another ; nor shall vessels bound to or from one State be obliged to enter, clear or pay duties in another.

"Vessels" and "ports"—steam vessels are not even mentioned.

But that railroads as now operated should be regulated by law no one assumes to dispute. They are "public highways," "common carriers," but they are not the property of the public, they are not built by the public, not maintained by the public, and should not be controlled by the public in the sense that the navy, the army, or even a light-house is controlled.

"Rights," "privileges," "franchises," and "charters" are granted them with extraordinary powers, still their ownership, liabilities, and duties are vested in private individuals, and these should be allowed to operate them as any other business, for the profit in them. There are scores of railroads the property wholly of one man, or family, and hence whatever may be said of their relation or duty to the public, they owe no more than other individuals, or other corporations composed as they are of individuals.

"The Interstate Commerce Bill" errs in attempting to regulate tariffs, to say at what cost certain service shall be performed, ignoring the expense of building, equipping, maintaining, and

operating the several different roads, all subject to entirely different conditions. That is, in its aim to prevent discrimination it does discriminate. That while it proposes to prevent small local hardships, it entails upon the general and great public, the numberless consumers, still greater hardships, heavier freights. That the object of the bill is good no one doubts, but that it is full of difficulties, "hardships," and even in the interpretation of a wise and judicious commission will take many years, with other Congressional amendments and "suspensions" to harmonize and to understand the true meaning of "Under substantially similar circumstances and conditions."

There is still another side, and one in this era of anti-monopoly that should not be overlooked by the statesman, nor be lost sight of by the patriot. That when our Republic was threatened, was in the very throes of destruction, civil war, and dissolution, the Government called to its aid these same "builders," these railroad owners and managers, to aid, to come to the rescue, to build more roads, to bind this continent together by transcontinental railways. A network was soon the result. Soldiers and the munitions of war could be placed at any desired point within a few hours. The effect of their potency and efficiency is seen to-day in an unbroken continent, one government, and a happy, united people.

The railroad during this time solved still another heretofore vexed question—the Indian question. The locomotive has been to the Indian upon our plains what the white sails of commerce have been to the inhabitants of the isles of the sea—THE CALUMET OF PEACE.

"Oh! not upon our tented fields
Are Freedom's heroes bred alone;
The training of the workshop yields
More heroes true than war has known.

"The skill that conquers space and time,
That graces life, that lightens toil,
May spring from courage more sublime
Than that which makes a realm its spoil."

PART IV.

OTHER HEROES THAN THE WORLD'S.

“Honor and shame from no condition rise;
Act well your part, there all the honor lies.”

If Plutarch found in his time “Lives” worthy the imitation of the Greek and Roman youth, why not in our age, and in their sphere, should not some of our men be referred to as examples for our youth?

Some men are great in conception, some in execution; in both were

H. M. HOXIE, GEORGE NOBLE, AND G. J. FOREACRE.

Circumstances do not make men, neither do men make circumstances. The proper direction of circumstances makes men. And whoever becomes great in whatsoever walk of life, is the man who is able to see, to grasp and to direct circumstances. Such a man was H. M. Hoxie, another was George Noble, and still another was G. J. Foreacre.

There were in their lives remarkable likenesses, peculiarities, contrasts; in their deaths coincidences worthy of mention here. Mr. Hoxie died (1886) November 23d, aged fifty-six; Mr. Noble died eleven days later, December 4th, aged fifty-six; and Mr. Foreacre died December 15th, eleven days later, aged fifty-eight.

However, their arduous toils, their disappointments, their successful labors, and their rich rewards can best be narrated separately.

H. M. HOXIE

Was a native of Macedon, New York. He early in life moved to Iowa; showed in boyhood energy, decision of character, and, during the war, on account of his conspicuous ability and tact in the control and management of men, was appointed Provost Marshal of the State. In this position he performed his duties in such an impartial manner as to attract the attention of the civil as well as military officials.

When the building of the Union Pacific Railway was undertaken, Mr. Hoxie was offered a position of trust and responsibility, which he filled in such a manner as to win for himself the respect and admiration of General G. M. Dodge, the Chief Engineer, to whose brains and energy the inception and completion of the Union Pacific are mainly due.

A change in the administration of this road was brought about and Mr. Hoxie, at the earnest solicitation of Mr. Wm. E. Dodge and others, took charge of the International Railroad then building in Texas. He remained with this road some twelve years. By his economical management and wise forethought he succeeded in making this road one of the best in Texas, greatly strengthening himself in the estimation of both the stock and bondholders. The International was at this time of no small importance, embracing in its system seven hundred and eighty-two miles.

During this long connection, these twelve years, Mr. Hoxie endeared himself to the people of progressive ideas on account of his decided favor and approval of every enterprise for the development of the country and the advancement of the people. The Christian minister, the temperance lecturer, and the schoolmaster were the recipients of his favors and his substantial support. "Put me down in favor of public schools and against whisky," was his pronounced position.

When the great Southwestern system was formed out of the International and Great Northern, the Texas and Pacific, the Missouri Pacific, the St. Louis Iron Mountain and Southern, and other roads, aggregating some six thousand five hundred miles, Mr. Gould selected Mr. Hoxie as one of the higher officials. His successful management continued through years, his promotion keeping pace all the time, till at his death we find him Vice-President and General Manager, the sole executive of the entire system. While his death was doubtless occasioned by the arduous labor growing out of the intricate, the delicate problems of the great strike, 1886, on the system, the seeds of disease were sown long before this. His physical frame was never strong enough to fully meet the demands of his brain power.

His greatest service to his

COMPANY, THE RAILROADS, AND THE COUNTRY

was performed in his exercise of a clear conception of right, and an inflexible adherence to this conception. He was not unwilling to change, even to yield; his was not a stubborn, stolid obstinacy—it was a consistent firmness, based upon that highest of intellectual powers, an unerring perception of the truth, however surrounded and complicated with the environments of policy. These mental convictions were sustained by a necessary—an equal—moral courage. In short, the life of Mr. Hoxie can be summed up in these three words—*firmness, fairness, faithfulness*.

The strike on the Southwestern system settled two great questions:

First, the right of employers, the owners of property, whether corporate or individual, to manage it in their own way under the laws.

Second: It settled also as divine a right as sacred a duty, that of employes to demand for their labor the greatest compensation; this not granted, to stop work or continue as pre-

ferred. In this contest there was a strange inconsistency upon the part of the employes, a discrimination in their own actions: If it were right to derail, to stop freight trains, why not right to stop, to destroy passenger and mail trains too?

Harmony restored, Mr. Hoxie sought to regain his shattered health by travel and by the aid of the best surgical skill in our country, but without restoration. Still, in his sick-chamber his mind went back to the faithful in his employment. One of his last inquiries, perhaps the very last, away in New York City, he telegraphed his Chief Superintendent in that department: "What has become of the boy-operator, E. H. Sladek, that saved bridge Thirty-seven on the night of the 14th of February, 1885?" The answer was sent: "He is occupying an humble position as night operator." Mr. Hoxie directed his promotion at once; he was sent to Sedalia, and occupies a lucrative position in the Superintendent's office. What a contrast! Napoleon, on the lonely island of his last banishment, that stormy night on which his spirit left his doubly exiled body, kept muttering: "TETE DE L'ARMEE," *Head of the Army*. Mr. Hoxie, forgetful of himself, inquires: What has become of the boy that saved the burning bridge?

But let those speak who were nearer, more competent to judge, and abler to express the appreciation of his associates and their estimate of him:

Whereas, We have to-day received the sad news of the death of H. M. Hoxie, First Vice-President of the Company;

Whereas, We have been associated with Mr. Hoxie as employes during the past five years, in which he has been connected with the management of the Missouri Pacific system as General Manager, Third Vice-President, and First Vice-President, some of us having held positions in connection with his management of railways for a still longer period, and

Whereas, The successful results which have attended his management of railway affairs are a source of gratification and pride to all who have worked in harmonious relations with him in carrying out the policy which he adopted, and

Whereas, The uniform courtesy and kindness of Mr. Hoxie toward all employes with whom he came into personal relations, and the interest and appreciation shown by him in the work and welfare of all, whether personally known to him or not, have established between himself and those connected with his management the relationship of friends as well as co-laborers, therefore,

Resolved, That in the death of H. M. Hoxie, First Vice-President, this Company has lost an executive whose ability, judgment, and strength of purpose have been of great and lasting benefit not only to this system of railways but to the railway interest of the entire country. The employes have lost a leader whose methods have tended to enlarge the dignity of the business in which we are engaged, and whose example has been an incentive to the attainment of the highest rewards of our profession through diligence, fidelity, and labor. We have lost a friend whose personal qualities endeared him to all who were brought into relations with him, and bound all who were within the circle of his official authority by ties of admiration and respect.

Resolved, That the signatures of all who are present be attached to these resolutions, and that the original be forwarded to Mrs. Hoxie as a memorial.

These resolutions were signed by the officers and employes of the Missouri Pacific system.

GEORGE NOBLE

Was born in Franklin County, Pennsylvania, 1830. While yet a boy he embarked in the railroad business, commencing like all beginners at the bottom round of the ladder in a subordinate position on the Pennsylvania Railroad. He remained with this road until 1862 or 1863, when he severed his connection with it and went West to look after the mining interests of his uncle, Col. Thomas A. Scott, in California and Arizona. He returned from the West in 1866, and was appointed Superintendent of the Eastern Division of the Kansas Pacific Railroad. He served in this capacity until March 1, 1874, when he resigned to accept the general superintendency of the Texas and Pacific Railroad, which office he held until May, 1881. Col. Thos. A. Scott (1872) came into the possession of the Texas and Pacific Railroad, formed out of three distinct corporations, all together controlling only forty-four miles of roadbed. Thirteen miles were added before

Col. Noble took charge (1874). Under his administration the line had reached, May, 1880, four hundred and forty-four miles; May, 1881, eight hundred miles, with contracts perfected for the completion of the lines from New Orleans to El Paso; or in the aggregate, in January, 1882, arrangements had been made for the completion of the whole, one thousand four hundred and eighty-seven miles, virtually (via Southern Pacific) connecting the waters of the two oceans.

Col. Scott's health failing rapidly, he sold his interest in the Texas and Pacific to Mr. Gould.

With "the great projector" of the system gone, Col. Noble tendered his resignation—retired with his uncle. His connection with the road began at a most inauspicious time. It was virtually without roadbed, without rolling stock, and paralyzed with an accumulated debt, without credit and without friends. At the close of the seventh year he left it the longest line in the State.

Details are out of place here, but when it is estimated that it requires of material, twelve thousand cars, equal to one hundred and twenty thousand tons for each one hundred miles, equivalent to twelve million tons hauled one mile, some conception of the extra work done by the road can be gained, and all in addition to a heavy commercial traffic besides. All this extra transportation had to be provided for by the General Superintendent through his subordinates.

What a grand peace army! Still all were not sunshiny days. Col. Noble had in that great army discordant, discontented men. When the strike of 1877 swept over the whole country, the Texas and Pacific, with other roads in the State, suffered its full share of loss of property and traffic.

An incident occurring then must not be omitted. Col. Noble was absent, returning on Saturday night. Sunday morning he was met by a committee of the men making certain demands.

His reply, so characteristic of him, was: "No, gentlemen, I will not give you an answer on the Sabbath day. I do not engage to transact any business on that day, but if you will wait until to-morrow morning I will give you a reply." The excited crowd withdrew. He went to church as usual. Monday he gave his answer, and men, who the previous day were frenzied with their imaginary wrongs, throwing their hats into the air, hurrahed for George Noble!

It was a fixed habit of the Colonel never to go to his office on Sunday, never to transact any business on that day. In the morning he attended Sabbath-school, and at 11 o'clock he was in his accustomed seat listening to his pastor as he dispensed the light and truth of the Gospel.

For nearly five years after his resignation he engaged in private business, having large interests in both mining and cattle.

The Texas and Pacific going into the hands of receivers, January, 1886, Governor John C. Brown called again to his aid his tried friend, believing that the *builder* was the best *rebuilder*, and hence we find the Colonel put as agent of the receivers, and soon as General Superintendent of the Texas and Pacific, with headquarters at Dallas. The work of rebuilding had hardly begun before upon them was "the strike," which, although originating upon the Texas and Pacific, was soon transferred to the Missouri Pacific, or Southwestern System. The Texas and Pacific, being in the hands of the United States Court, received the prompt and efficient protection of the Government, and the interference was of short duration.

Still, while the whole people were excited over the troubles, railroad managers and employes alike, Col. Noble stood in the storm with all his senses about him, firm, unembarrassed—looked upon as a reliable friend by the employes, and known to be faithful by the employers. His address, his work, his uniform good temper did much toward bringing about harmony. Like Nep-

tune of the seas, his very presence calmed the tumultuous crowd and dispelled the angry passions of the excited multitude.

His loss to the people among whom he lived, and for whom he worked, can not be estimated, and there will not be an employe on the railroad of which he was one of the heads who will not feel that a friend truly is gone. Visiting his office a few days since, the draped walls, the vacant chair, all, all too truthfully forced upon me the realization, and involuntarily I repeated:

But, O, for the touch of a vanished hand
And the sound of a voice that is still!

But let the man of God, one of his spiritual advisers, add his tribute:

It was my privilege to have known our deceased brother for many years. To know him was to love him. His friendship honored those who were allowed to share it. He was a brave defender of good government, yet always with respectful regard for the rights of others. To his superiors in office he was loyal and true, to his equals generous and courteous, to his subordinates considerate and kind. While a master of minute detail in matters of business, he grasped with the mind of a statesman measures of wide policy. He was the friend of Texas. He loved her climate; he loved her soil. He was among the first to perceive her grand possibilities and to execute measures by which their realization became practicable. His mind was early aware of her vast latent resources, and his best years were given to perfecting agencies for their development. But why speak of these things with my stammering tongue? The growing towns from Texarkana to El Paso, owing their prosperity largely to his genius, weave the chaplet of laurel we lay upon his brow. The happy families all along the line, helped to comfort by his toil, place their sprig of evergreen within his sepulcher. The laborers, who loved to serve beneath his gentle hand, gem with tears the floral honors on his bier. This is the homage which virtue alone can attain, and is rendered only to the good. He is not dead but sleepeth; not lost to us, but gone before. He filled out the rounded requirements of God's law. 'What doth the Lord require of thee but to do justly, and to love mercy, and to walk humbly with thy God?' No man ever accused him of an injustice to the value of a hair; none was ever weak who did not experience his mercy; no glance of pride ever burned in his eye. Such men are rare in any age. It is the glory of ours to have produced this one, and we lay him down to rest with the best homage of our grateful but afflicted hearts, a recognition of his worth.

Rest in peace, and let eternal light shine upon thee: and the glory of the everlasting day gather round about thee. Thy example is our incentive to noble deeds, thy memory our benediction.

G. J. FOREACRE

Was born at Rainsborough, Ohio, February 19, 1828. Early in the "fifties" he removed from Ohio to Atlanta, Georgia, beginning work with the stage line between that city and Montgomery, Alabama. He remained with the stage line a short time only, and then took a position as section boss on the Central Railroad. This he filled with credit to himself, and with such satisfaction to the company that in a short time he was appointed conductor. This appointment was quickly followed by an order from the president promoting him to the Atlanta agency. While serving in this capacity he manifested that peculiar tact, a knowledge of men and business, the ability to manage, to direct, which made him sought by many roads. As agent of the road he was upon the eve of being again promoted when the war broke out. Although an Ohio man, he had lived long enough in Georgia to become thoroughly identified with her interests, and when the time for action came he enlisted and went to the front. In 1861 he left Atlanta as Captain of Company "B" of the famous Seventh Georgia regiment, and throughout the sanguinary contest was unwavering in his fidelity to the Southern cause. He was a gallant soldier, and was wounded severely in the first battle of Manassas. His illness, consequent upon this wound, was painful and protracted, and at times his life was despaired of by his friends. When but partially restored to health he resumed his place in the army and was subsequently promoted to the colonelcy. The war ended, he wisely accepted the situation and went bravely to work to repair his broken fortunes. Although Atlanta was in ashes, he believed she would become a thriving, busy city; that she was not only the "Gate City," but the railroad center of the Southeast.

The wound received at Manassas was still annoying him to such an extent that his activity was greatly impaired. He pur-

chased a farm near Atlanta and started the successful Sugar Creek Paper Mills. Here, while his health was recovering, he declined several fine railroad positions, but after growing strong and sufficiently restored, as he thought, he accepted a place with the Central Railroad again, as General Agent.

During this time the Montgomery and West Point Railroad, then a long line of some two hundred miles with its branches, was in such a condition that it must be either repaired or abandoned. Mr. Charles T. Pollard, its president, applied to Mr. Wadley of the Central, to let his company have Col. Foreacre for this important and expensive work, requiring the rarest combination of economic, executive, and administrative ability. Mr. Wadley consented, and Col. Foreacre, from June, 1870, to April, 1872, addressed himself to this difficult task. When he took charge, the fact that a train arrived on time was an agreeable surprise—not to come at all was the rule.

Col. Foreacre was a man of magnificent physique, of splendid personal appearance, of frank and easy address. He possessed a high practical knowledge of the work he was about to undertake. Once a poor employe, he had the liveliest interest in the employes, and soon became acquainted with every man on the road. Before a train would leave the depot he would personally interview the engineer, examine the engine, see for himself that everything was "all right," then with an approving smile he would say: "Jack, try to get over to-day." The result—the train steamed out with everybody in a good humor, and a determination to look out for and avoid running recklessly over the bad places. Within less than three years this road (now the Western Railroad of Alabama) was the best equipped and made the quickest time and surest connections of any in the State or in the South.

Here Col. Foreacre showed his economic management in lengthening the runs. He saw the same cars over the same gauge roads could be advantageously handled by the same train hands

and with more comfort to the passengers. Hence the trip from Atlanta to Montgomery (heretofore two separate managements with two separate crews) could be run as one solid through train. This was done, and with such success that soon after leaving the "Western" he secured, by his personal influence, a through sleeping-car line from the North to the South, inaugurating the line from Washington to New Orleans via the Kenesaw route. This was really the pioneer line, using a car-hoist to overcome the broken gauge at Lynchburg, Virginia. It was also at his suggestion that the first sleeping-car line from Boston to Florida was established. And to this arrangement to-day Florida owes her popularity as a winter resort for invalids.

It was during his connection with the "Western" that his interest in schools and colleges became known to the writer. The Agricultural and Mechanical College of the State was to be located by the legislature, and, with four other towns and cities competing, Auburn was an applicant. His idea was that the college would be a source of revenue as well as an ornament to his road. Its location at Auburn has verified his anticipation. It is one of the most popular and flourishing institutions in the State. Educational gatherings all along his lines received his personal recognition and his strong support.

From the "Western" he returned to the "Central" and was Superintendent of the Atlanta Division. From April, 1875, to March, 1877, he was General Manager of the Washington City, Virginia Midland and Great Southern Railroad; while, returning to his home, from March, 1877, to April, 1881, he was General Manager of the Atlanta and Charlotte Air Line Road. During his connection with this road he projected many smaller lines, becoming Superintendent of the Georgia Pacific. He entered the service of the Baltimore and Ohio Railroad January 1, 1884, as the General Superintendent of the Trans Ohio Division, with headquarters at Newark, Ohio. This position he held till his death.

The Virginia Midland was really a Baltimore and Ohio line, and his return to this company was a reciprocal gratification. Here, besides having a larger sphere, he had a company that was stable in its management, progressive enough, conservative enough, appreciating and rewarding diligent and faithful officials.

Col. Foreacre possessed those great prime requisites of all successful managers. He was a man of marked intellectual vigor, conscientious in the discharge of every duty, inflexible in his adherence to the right, unswerving in his support of order and good government. He had a heart of womanly tenderness, dispensing on all occasions with an open hand to the calls of deserving charity. With a most happy temper and pleasant deportment he won without effort the respect and love of every one whom he met.

He loved Atlanta. It was the home of his adoption, the field of his greatest efforts and most successful triumphs. The graves of his children were there, and naturally he desired that his last resting-place should be there. Loving and devoted friends saw that his wish was carried out. His was one of the largest, if not the very largest, funeral processions ever witnessed in that city. Citizens of high and low degree, senators, governors, all were present to show their appreciation of the life and their profound sorrow at the death of G. J. Foreacre. Fit inscription for his tomb would be:

"Mark the perfect man, and behold the upright: for the end of that man is peace."

These men did not own the railroads — were simply employes.

H. M. Hoxie, George Noble, and G. J. Foreacre were alike poor boys, industrious youths, good citizens, Christian gentlemen (consistent members respectively of the Episcopal, Presbyterian, and Methodist Church). They so directed circumstances as to become honored in their day and generation. Their "Lives" should be read, for in them our young men have the key of their success!

PART V.

MEETING OF THE N. E. A.—EVOLUTION OF THE SLEEPING CAR— FEATS OF ENGINEERING.

“In 1859 California and Oregon, on the Pacific, were States of the Union, yet news from them could only reach their sister States of the Atlantic seaboard in twenty to thirty days. The glamour and pageantry of the Crusaders in the eleventh and twelfth centuries were revived in the fifteenth and sixteenth by Columbus,

Cortez, and Pizarro, and repeated in the nineteenth by Taylor, Scott, Fremont, and Doniphan. As a resultant were the wonderful gold discoveries of 1849 in California and a State born full-



PONY EXPRESS.

fledged and armed in a day, as Minerva from the brain of Jove. Among the wonderful and prolific accomplishments of Western thought and genius was the conception and successful fruition of the pony express, conceived amid the mountain grandeur of the Western plains.

“It was formulated by Senator Gwinn, of California, and fashioned and nurtured to success by Russell, Majors, and Waddell, of the overland mail-coach system, in 1858, as established by Congress. The ocean communication via Central America occupied

twenty-two days, with propitious sea voyages. Could this be reduced? The stage took from twenty to twenty-five days, according to the weather."

The pony express required sixty riders, brave, bold, good fellows. Their watchword was "Excelsior."

The pony express started weekly from St. Joseph and San Francisco, mails and telegraphic dispatches for these points and



This train was under the management of Mr. Charles A. Brown, of the Chicago, Milwaukee and St. Paul Railway.

the cities in the far East being transferred at Salt Lake, 124 hours from St. Joseph and 136 hours out from San Francisco.

What a change!

"From Hell Gate to Gold Gate
And the Sabbath unbroken.
A sweep continental
And the Saxon yet spoken."

Whether on the *trail* of "'49" or on the *rail* of "'69," or by the tedious *voyage* around "the Horn," our mother-tongue has had much to do in the occupation of this continent.

There left Boston, Friday (4.30 p. m.), July 6, 1888, a train consisting of eight Pullmans and a baggage car for San Francisco.

This train did not travel as fast as the one (centennial year) making the time between New York and San Francisco, 3,317 miles, in 83 hours and 23 minutes, three days and a half (3.47), or forty miles an hour, but, stopping at many points of interest, spending whole days in cities, reached San Francisco Tuesday, July 16th

(4.30 p. m.), with 231 passengers, all delighted with the safety, comfort, and pleasure of the trip.

There were trains from the Lakes, trains from the Gulf, trains from the Prairies, trains from all points of the educational compass, until there were gathered and housed *within* the Golden Gate *twenty thousand* souls — the National Educational Association.

Not all of these were teachers — they were all learners, however, and carried home with them lessons of wisdom more precious than the gold of Ophir, more enduring than the riches of "the silver satrap of the Sierras."

One agency, a great factor in the success of this meeting, was the Palace Car. Travel by night

as well as by day, economy of time, made the sleeping car a necessity, and the inventive genius of man was not long in solving the question.

Without entering into a discussion—leaving out all controversy—it seems that Mr. Woodruff was the first to conceive and to carry out practically his idea of a sleeping car. It is not denied that



No. 9. AN IMPROVISED SLEEPER.

both Mr. Wagner and Mr. Pullman profited by Mr. Woodruff's invention; and while, doubtless, the very first attempt to furnish the railway traveler a place to sleep was upon the Cumberland Valley Railroad of Pennsylvania, Mr. George M. Pullman early comprehended the real magnitude of the problem, and set about its solution.

Mr. Pullman's first effort was the conversion of "No. 9," as it was known, an ordinary day coach, into an improvised sleeper.

In 1864 he perfected plans for what was to be a radical change even in sleeping cars. He built at a cost then thought to be a fabulous sum for the purpose, \$18,000, the "Pioneer."

This car being wider and higher than any heretofore in use, required changes on the part of the railroads in their bridges and culverts. This was cheerfully done by the railroads;

the traveling public now fairly demanded this sleeper of them.

In 1867 the Pullman Car Company was organized. About the same time the Wagner Company came into the field, furnishing sleepers for the Vanderbilt and connecting lines.

Sleepers by night, luxurious couches, suggested spacious drawing-rooms for day travel, and the Parlor Car is furnished. And now Hotel Cars are needed, and the Pullman Company introduced the first, aptly named the "President." This car was put into service on the Great Western Railway of Canada, 1867.



PARLOR CAR.
(COURTESY OF THE CHICAGO AND NORTHWESTERN.)



DINING CAR.
(CHICAGO AND NORTHWESTERN.)

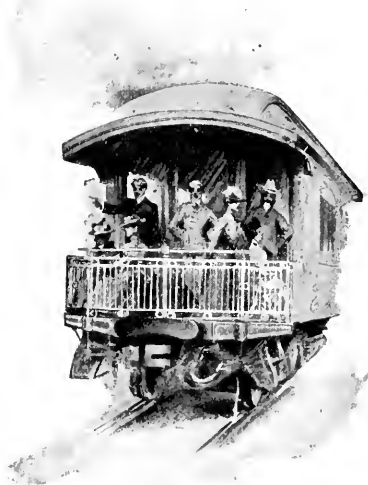
And now another demand. Not only a "covered way," but "guards" must be furnished, and a *tunneled* train—"vestibuled" called—is the latest product of Mr. Pullman's fruitful evolutions.

The first road running these was the Pennsylvania (1886).

On these trains carrying sleeping cars, a dining car fitted out with a smoking saloon, a library with books, desks, and writing material, a bath room and a barber shop, an American citizen travels in as

The Hotel Car was rather cramped. The tables, portable, had to be arranged between the seats; hence the Dining Car "Delmonico" makes its appearance, 1868.

But to reach this car, passengers—men, women, and children—had to pass through other cars, cross over platforms with more or less inconvenience and positive danger.



OBSERVATION CAR.
(CHICAGO AND NORTHWESTERN.)

princely style as does the crowned head in Europe on his "royal special train," and at figures that should always be pasted in the hats of party politicians—chronic disturbers of the peace and quiet of our people.*

COMPARATIVE RAILROAD AND PALACE CAR RATES.

| COUNTRIES. | First Class. | Second Class. | Third Class. | ROUTES. | Distance in Miles. | Berth Fare. |
|------------------|--------------|---------------|--------------|-------------------------|--------------------|-------------|
| | Cents | Cents | Cents | | | |
| United Kingdom | 4.42 | 3.20 | 1.94 | Paris to Rome ----- | 901 | \$12 75 |
| France ----- | 3.86 | 2.88 | 2.08 | New York to Chicago-- | 912 | 5 00 |
| Germany ----- | 3.10 | 2.32 | 1.54 | Calais to Brindisi ---- | 1,374 | 22 25 |
| United States--- | 2.18 | ----- | ----- | Boston to St. Louis --- | 1,330 | 6 50 |

The policy inaugurated under the following action doubtless had much to do in the increased and increasing success of the Association:

Under the head of resolutions, the following was offered by Professor Alexander Hogg, of Texas, and unanimously adopted:

In order to effect a better and more uniform system of special rates upon the various railroads and other methods of conveyance; to secure, as far as possible, some definite concert of action upon the part of the authorities of the various lines of transportation for the next annual meeting of the Association, therefore, be it

Resolved, By this Association, that a committee of seven be appointed by the president, to be known and styled as "The Department of Transportation."

Resolved, That one of them, by appointment, shall be the president of the department, and that the remaining six shall act as chairmen of the six districts to be hereafter determined, and they shall have power to appoint an assistant or assistants to aid them in properly organizing and perfecting this department.—*Proceedings of National Educational Association, Louisville, 1877.*

*But the man who made it possible to change the heretofore tedious journey to a continuous delightful trip from ocean to ocean has passed away (1898).

No dull, lifeless, speechless marble is needed to tell of his work. To-day from the shores of the Atlantic, over and above the rugged Alleghanies, through the dark cavernous tunnels of the Great Divide, by the placid waters of the Pacific, his monument—the Pullman Palace Car—is moving, freighted with the hopeful, enterprising traveler, who will daily, as well as *nightly*, add his praise to, and bless the name of George M. Pullman.

The difficulties in the way were studied just like any other problem, and while the very best arrangements were not secured "for the next annual meeting," nor the next, still the transportation has been the main question in selecting the place of meeting, till now, through the combinations—traffic associations—not only is *one fare* granted for the round trip, with side excursions, some for less than a fare, but the railroads have become the financial agents, the collectors of the Association (all tickets having a *coupon* for the "plus two dollars" membership fee).

This arrangement made the Madison meeting the first great meeting, reaching the "thousands," and San Francisco the greatest up to date.

The railroads have shown their interest in the education of our common country in this, the finest and largest collection of "systems" and "methods," in bringing together the leading and controlling spirits of the three hundred thousand men and women engaged in the responsible training of the twenty millions of children for the highest duties known to the American citizen—the casting of an intelligent ballot.

Again, as late as 1850, there was not a mile of railroad west of the Mississippi. The "centennial year" train could not have made the trip "3.47 days" before 1869—neither could the great National Association have collected its teachers—nor could the thousands, millions, who now traverse the continent without comprehending the time and the distance, have done so but for the undertakings, the accomplishments of the projectors and builders of the Pacific railways. Commercial interests had time and again suggested these great enterprises, and men *then* called "visionary" for the lack of the later coinage, "crank," had sent out reconnoitering parties, who made preliminary surveys; but the necessity for so stupendous a work was not brought home to the nation until the Southern States attempted to *secede*—to divide this Union by a geographical, an imaginary line east and

west. This action forced the Government to lend its aid in constructing a real line—*two lines* of steel rail from the Missouri to the Pacific—thus uniting by Art what long since had been decreed by Nature—the perpetuity of this Republic.

A faithful description of the work is beyond the scope and purpose of this humble contribution.

To determine the location alone of a route for the Union Pacific, 15,000 miles of instrumental and preliminary lines were run; 25,000 miles of reconnoissances were traveled. The engineers of

the Central Pacific had to do the same thing, of the same difficulties, both parties in sight less hospitable erts and moun-preliminaries work of con-gins, and for der the leader-M. Dodge and respectively, roll-calls of



THE GEORGETOWN LOOP.*

and in the face of native tribes than the des-tains. But the completed, the struction be-five years, un-ship of Gen. G. Chas. Crocker, armies of men, thousands,

Teuton, Celt, and Celestial (the latter the most willing worker), with shovels and pickaxes, the implements of peace and progress, are marching west and east over boundless plains, through waterless deserts, and up the rugged mountain with its whelming snow-drifts.

But these *giants*, instead of piling Pelion upon Ossa so as to scale Olympus, by a system of *loops* and *tunnels* made step-ladders of the lesser peaks, not to ascend to heaven, but to place *among* the heavens a smooth path, "a plain way" for all tongues and all nations, and that, too, for all coming centuries.

*Distance between Silver Plume and Georgetown by the loop, four and one tenth miles; by wagon road, only one mile. The railroad track crosses Clear Creek eighteen times.

A loop is a happy device of engineering to go *through* a mountain by going *around* it—a tunnel, to go *over* a mountain by going *through* it.

“The end draweth nigh,” and victory complete over nature’s barriers is proclaimed upon the morning of the 9th of May, 1869, when near the head of the great Salt Lake they lay down the last tie of polished laurel bound with silver bands. Nevada sends a silver spike, California sends two of gold, while Arizona, more practical than either, sends three—one of silver, one of gold, and one of iron.

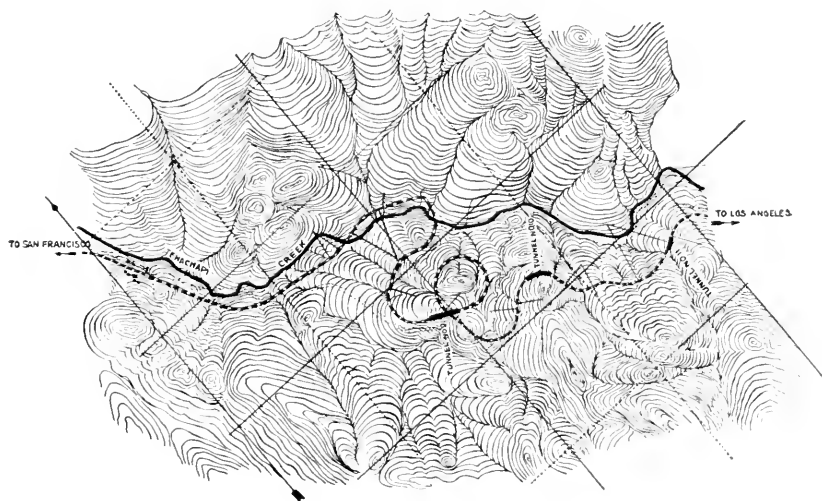
“The silver sledge gleams in the air, and the blow that follows is heard farther than any other blow ever struck by mortal man, and all over the continent the ringing of bells and booming of cannon simultaneously announce the tidings of the feat.”* Instinctively the locomotives salute each other, touch pilots, and with a hearty hurrah—a shrill whistle—add their congratulations upon the consummation of this union, this wedlock of the oceans.

The costs of these two enterprises respectively, the Union Pacific about \$39,000,000, and the Central Pacific about \$140,000,000, but in the two years, 1872 and 1873, there were saved to the Government alone in the transportation of postal and war materials, \$3,789,788, or over twenty per cent upon first cost.

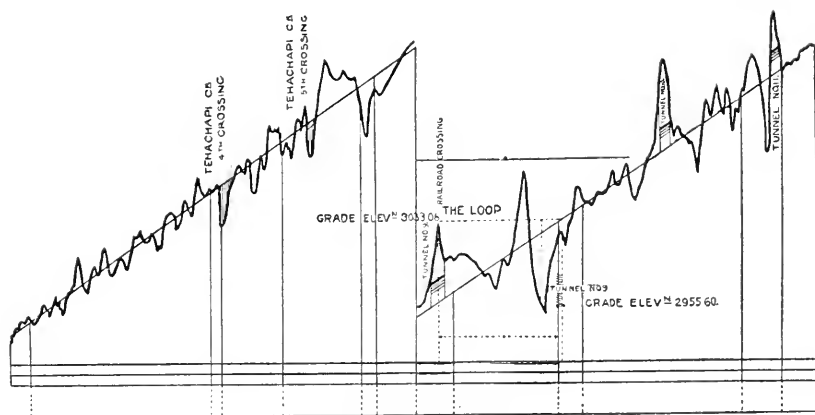
The builders of this highway, elated by continued success, flushed with recent victory, soon again are found approaching each other from “the West” and “the East,” and the Southern Pacific and the Texas Pacific, under respectively the same leaders, with the same associates, meet a second time, 1882, at SIERRA BLANCA, and another transcontinental railway is furnished “on or near the 32° parallel of latitude.”

*The last spike and the hammer that drives it are in electric communication with nearly all the fire alarms in the country.

Upon the Southern Pacific the engineering, and building too, if possible, were even more difficult than upon either the Union



THE PROFILE.



THE ELEVATION.

or Central Pacific. The profile and elevation are given of this wonderful piece of engineering—the Tehachapi Loop, or Love

Knot, as it is sentimentally called. The gorge is two miles long, the loop fourteen, passing through fourteen tunnels. It is a fine *object-lesson*. A description, as given by a great teacher, is added:

"Now we look down upon four tracks we have come, and now we look up upon three tracks we are going, that are forever crossing themselves like a confused witness."

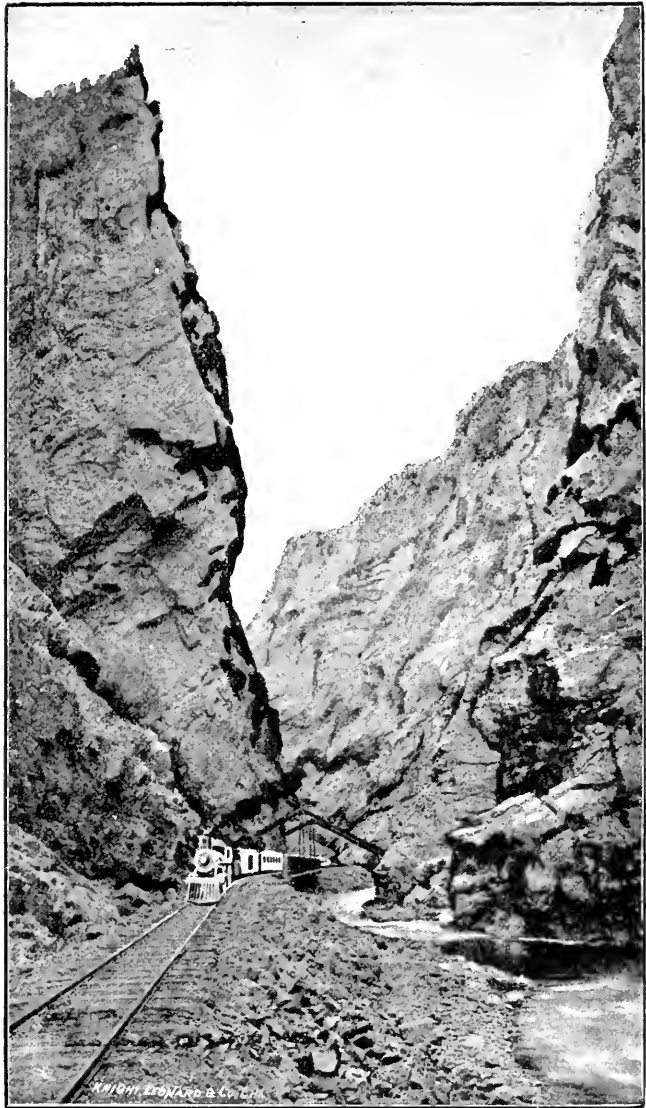


... "The double-stranded thread on which these heights are strung, called the loop, is three thousand seven hundred and ninety-five feet long, a great double-bow knot of steel."

The engineer talks of "Cuts" and "Fills," the latter taken from the former, but "The Royal Gorge" is a "cut" made by the Creator Himself—excavated by the waters of the Arkansas River in adding its contribution to the "Father of Waters"—to the Atlantic Ocean.

The top of the walls of this "cut" above the tracks is 2,600 feet; the distance between the walls at narrowest place is 55 feet; the length of the gorge is about two miles. In this splendid piece of work by Nature, Art comes in, and the engineer,

Mr. Shaler Smith, finding it impractical, if not impossible, to secure a foundation suitable, conceives the idea, and builds what to the entire engineering world is known as THE HANGING BRIDGE. The boldness of this conception was only equaled by the successful execution of it. It has won the praise of both continents. Here science and skill were most happily wedded.



THE ROYAL GORGE.

With this introduction the traveler—the stranger—is prepared to feel the inspiration, to appreciate the truth, of the following:

“Mortal ere you enter here,
Pause and bare thy brow before Him,
You are entering a temple which the Mighty One did rear;
Put thy shoes from off thy feet,
And with sacred awe adore Him
Throned in awful might and majesty;
The Great One dwelleth here.”

NEW ROADS.—In our country railroad building (1888) has not kept pace with previous years; not so much as in 1887, but is even more active in foreign countries.

It is announced that “The Tientsin Railway, the first practical railway in China, which was formally opened in October, 1888, is eighty-one miles long. This road extends from Tientsin to Tonsam.”

It is but fair to believe that this railway work is the dawn of a new civilization within the heretofore closed walls of this mighty empire. The *returning* Celestial may have had something to do with it.

South America, perhaps, in Peru and Bolivia, is prosecuting the most stupendous railway enterprises of this era, and it is gratifying to know that the suggestion found on page 23 is now fulfilling.

RAILROADING ABOVE THE ARCTIC CIRCLE.—“An important engineering enterprise, now in progress, is a railroad to the Arctic Circle. The Swedish and Norwegian railroad now building from Lulea, on the Gulf of Bothnia, to Luffoden, on the North Sea, is partly situated within the Arctic Circle, and is some 1,200 miles farther north than any railroad in Canada.”*

*Stockholm, December 7, 1900.—“The most northern railroad in the world, which runs from Narvike, on the west coast of Norway, to Gellivari, in Sweden, has been opened. It is situated north of the polar circle and farther north than any of the Russian, European, or Asiatic lines. It has twenty tunnels, and communicates with Christiana, Stockholm, and with the Russian and Siberian lines through Finland.

Since the railroad is the only invading army that never breaks its line of communication, never "changes its base," why not attempt, not to reach the North Pole, but the "open polar sea," by building a railway to it? Such an "expedition," not able to go forward, could at least retreat.

SAFETY APPLIANCES.—Great progress has been made in the past two years in safety appliances. The deadly coal-stove has been superseded—not on all trains, but a beginning; a successful test has been made of steam heating. The first road to adopt steam heat was the elevated, in New York; the next, the Boston and Albany. An official of the latter gives the following: "We equipped two trains in the fall of 1886, and ran them through that winter. In the spring of 1887 the contract was made with the Martin Steam Heating Company to equip all our trains as fast as possible. In the fall of 1887 our New York train was equipped with steam heat, and now most of our passenger trains are so equipped."

The same official adds: "The electric light for trains was first tried by the Pennsylvania Railroad in 1884 on a few drawing-room cars only. The first entire train to be lighted by electricity in America (and as far as known in the world) ran from Boston to New York, over the Boston and Albany (Springfield Line), March 30, 1887. This train has been running continuously since."

In this advance heat and light have traveled together; the result of their merciful mission has been greater security to the life and comfort of the passengers. Meantime, the safety of the exposed and too-long-neglected train hand has received the consideration due, and the following is quoted in evidence that legislatures are looking into this matter: "The bill compelling all roads operating in the State of New York to equip their freight cars with automatic couplers has become a law. Until November 1, 1890, is given the roads to comply with the provisions of the law. The penalty for non-compliance is \$500 for each offense."

When we consider the great army of brakemen exposed to heat and cold, to sunshine and storm (on the cars, *between* the cars, UNDER the cars), and the number of these faithful fellows daily maimed or killed outright, the universal adoption of the automatic coupler must be hailed as the most *advanced* advance in railway safety appliances.*

SUNDAY TRAINS.—This is perhaps the most difficult problem—being both a religious and an economic question at the same time—that the managers of the roads have to confront. It is not true that the managers are responsible for Sunday trains. They would prefer no sound of whistle or engine bell be heard on their lines on the Sabbath. It is true that the patrons, the travelers, the shippers, are responsible. Says a late writer:

Competition is perhaps more severe between railroad companies than between any other class of business or carriers in the world. The merchant in Chicago, who desires to ship to Liverpool one hundred car loads of grain, knowing that his steamer sails from Boston on a certain day, and the choice of route rests between two roads, one of which runs trains on Sunday and the other does not, would not hesitate long in giving the business to the road running the Sunday train. The Detroit merchant, going to his store this morning, finding some article of merchandise called for by his customers which he can not obtain in the city, telegraphs to New York or Boston, for example, there-for. It is shipped by what road? By the road bringing it in the least time for the least money. Of two roads, one running Sunday trains and the other not, which will probably get the business?

Again, in California you receive a dispatch calling you to the bedside of some dear one in Boston, or any city east of the Mississippi, would you purchase a ticket by the road that lays over on Sunday in Ogden or Omaha?

Efforts are now making on several of the trunk lines to withdraw as many trains as possible from their roads on Sunday. This can be done in many cases without detriment to shippers,

* The Electric Headlight is one of the last and most successful of safety appliances. This device has prevented as many collisions—as many disasters—as the block signals and interlocking switches themselves

and will be done in all cases when all merchants will openly say: "We will not patronize nor have anything to do with the railroad that runs Sunday trains." This change must come through public opinion—through press and pulpit. The transcontinental trains between the Atlantic and the Pacific in the prompt delivery of the mails—in the interests of the public—ought, perhaps, to run; and within the States trains laden with perishable freight, or suffering live stock, should be allowed to reach destination without detention, with all dispatch.

Whatever may be the solution to this problem fraught with so many difficulties, surrounded by so many conflicting interests, it is safe to say that the railroad managers will cheerfully do their part in bringing about a speedy and a just settlement of the question.

GIFTS TO SCHOOLS.—Mr. W. H. Vanderbilt left in his will, additional to his former gifts, \$200,000 to be added to the general endowment of the Vanderbilt University. Cornelius, the grandson, desiring to fit the University to educate the whole man, liberal provisions having already been made for the departments of Letters and Theology, gave (1888) \$20,000 for building and equipping "Mechanical Hall," the second building of the Engineering Department, and \$10,000 for additions to the University library. Thus father, son, and grandson have contributed, and to this one institution, \$1,480,000.

THE DEATH OF MR. CHARLES CROCKER.—The National Educational Association, the success of which was so largely due to the management of the Southern Pacific Railway, had just adjourned. Many of the members were still enjoying the hospitalities of new-made friends on the Coast, or at the numerous pleasure resorts in the mountains, when it was announced that "at the Hotel del Monte, Mr. Charles Crocker died, 14th August, 1888, aged 65 years and 11 months."

He had been a sufferer for several years.

The resolutions passed by the Board of Directors of the Southern Pacific Company, of which he was Second Vice-President, set forth:

First: The irreparable loss the company has sustained.

Second: The great work accomplished by him as director in the construction of thousands of miles of railroads, thereby rendering millions of acres of land valuable.

Third: His personal characteristics, determination, directness, frankness, fairness; that the most exacting integrity and strictest honesty were interwoven in every muscle and fiber of his being; that his uprightness of character and sincerity of purpose commanded the admiration and respect of those who knew him best, and were a constant inspiration to the officers and employes who were subject to his direction.

His charities, as gathered from press and persons near him:

Some eleven years ago Mr. Crocker purchased the Ward Natural History and Geological Collection for \$50,000, presenting the same to the California Academy of Science. To the same institution he gave \$20,000 as a fund, the interest of which should be spent in giving employment to such persons as in their devotion to scientific pursuits have become incapacitated for active life.

This is known as "The Crocker Scientific Investigation Fund." In 1885 he presented to the Boys' and Girls' Aid Society \$33,000, a fund, independent of an annual sum, for its support. The same year he rebuilt the dome of the Golden Gate Park, destroyed by fire, 1882.

In addition to a large list of old friends, to whom he gave regularly, he furnished his wife, monthly, \$5,000, to be distributed by her in charities of her own selection. It was his custom to send checks every Christmas to all the Homes and Orphan Asylums. When, in October, 1885, the establishment of H. S. Crocker and Co., stationers, was totally destroyed, in which, while the largest sufferer, he did not stop to inquire the extent of his loss, but telegraphed from New York \$5,000 as a gift to the families of the two brave firemen who had perished at the fire.

Mr. Crocker was always affable, sometimes facetious, and in the goodness of his heart often gave when he doubted the propriety of the act. It is related by one present, that on one occasion two ladies seeking an audience with him were detained in the waiting-room, and on its becoming known to him, he said: "Show them in immediately; it does not do to keep ladies waiting." They had come in the interest of the "Old Ladies' Home." Mr. Crocker smilingly asked how much he was to give. "Oh, anything you please." Whereupon he responded: "Another cool robbery," and, drawing his check-book, he wrote and handed them an order for \$2,500.

In 1887, when the Sacramento Orphan Asylum needed money, he sent his check of \$1,000; and the very last act of his business life was to sign a check of \$250 for the Free Kindergarten School of Sacramento.

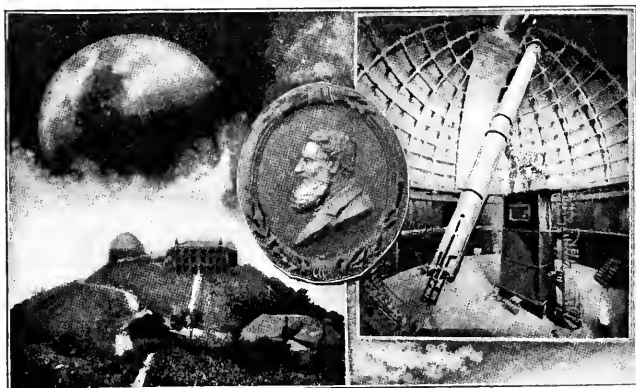
A very fitting close of his benevolent career. Sacramento was the home of his early activities; it was here that the four lifelong associates, Huntington, Hopkins, Stanford, and Crocker projected and matured the plans for constructing, and from which, as a basis of supplies, was built the Central Pacific Railway.

As if preparing the State for a happier race and greater destiny, he and his associates leveled and tunneled mountain chains, penetrated the forests, turned the channels of rivers, checked the ocean's inroads, changed the whole face of this Western Empire until now is fully realized the poet's dream :

" Beneath the rocky peak that hides
In clouds its snow-flecked crest,
Within these crimson crags abides
An Orient in the West."

(1896.) The President of the University of California writes: " Mr. C. F. Crocker, son of Charles Crocker, has made several important gifts to our Lick Observatory, which is a department of the University, and this year bore the expense of the expedition to Japan for observing the eclipse of the sun."

It seems truly that: "*The spirit of freedom and understanding, the spirit of counsel and might*" are his, in his youth, "*that he may be rich in good works.*"



THE LICK OBSERVATORY.

PART VI.

THE INCEPTION AND HISTORY OF STRIKES.

Since:

“ Man's first disobedience and the fruit
Of that forbidden tree, whose mortal taste
Brought death into the world, and all our woe,
With loss of Eden, ”

men have been discontented.

The giants in their wars against the gods, in their daring attempts to scale the heavens, “the piling of Ossa upon Pelion,” and “the rolling upon Ossa the leafy Olympus,” as narrated by both Virgil and Homer, though mythical and mystical too, are nevertheless convincing evidence of this same discontent.

Again:

“And when they had received it [their wages] they murmured against the good man of the house. . . . But he answered one of them, and said: Friend, I do thee no wrong: didst thou not agree with me for a penny? . . . Is it not lawful for me to do what I will with mine own?”

Oh, yes, but we are not satisfied. We thought it all right then, but we have been told it was not—that we should have received more.

Dissatisfaction, strikes, disaffection, and boycotts are nothing new in the world, whether among the flute-players mentioned by Livy two thousand two hundred and four years ago, or among the bread-bakers in the city of Magnesia in Asia Minor, when that town was included in the “Empire of the East.”

With the increase of capital and the introduction of labor-saving machines, strikes have become more frequent on this continent. The first strike in this country occurred in New York

City in 1803, when a number of sailors struck for an advance in wages. In 1806 the tailors established the first organization in the United States in the present form of trades union. The hatters organized in 1819 a union of their craft.

The Workingmen's Party, 1828, appeared as a local political party in New York, Boston, Philadelphia, and other cities. 1829, at the State election in New York, a workingmen's ticket was put into the field, and one candidate was elected to the legislature, Ebenezer Ford. The first local union of printers was formed 1831, and this same year the New England association of printers, mechanics, and workingmen was formed.

Passing over many organizations and unions, and even strikes with varying results, we come down to 1850-60, a period full of labor agitation. National and international trades-unions were organized, granting charters to local bodies and organizing new branches from Maine to California.

In 1861-65, during the war, the eight-hour movement obtained a great impetus. In 1866, an eight-hour bill for the benefit of Government employes was introduced into Congress, and finally became a law in 1868.

The Knights of Labor were organized in Philadelphia, 1869. Since this time to the present there has been a continuous growth in the number of trades-unions and an increase in their membership, attended by "strikes," "lockouts," and "settlements," sometimes by arbitration, usually otherwise, the trend, however, being toward political party organization.

In 1884 Congress created a National Bureau of Labor. The American Federation of Labor, a national organization with constitution, was formed 1886. This body and the order of Knights of Labor of America have been the two principal national labor organizations of the United States up to date.

The American Railway Union, a still later organization, an effort to draw from all the other railroad associations, thus to con-

centrate, crystallize, and solidify all the interests of all railroad employes, to amass, as it were, an army trained to obey the mandates of their leader, sprang into being June 20, 1893, and that, too, in Chicago. Just a little over a year ago, pretty youthful, not quite a year old, when they declared the strike upon the Pullman Company.*

The weak point of this organization, and seems not taken into consideration by its leader, was that it could only bring into its union portions of other orders.

Some of the Knights of Labor joined, some of the American Federation, and some of all the various orders, but these could not control their own. The part belonging to the American Railway Union would strike, but by far the larger part would not strike, and the same was found true of other organizations. All of these leagues, unions, or associations are secret, and their main object is to give to their members an advantage over all other citizens, and therefore when they come to deal with the actual or social and political rights they ignore the rights of all others.

Personal liberty is the corner-stone of our Government, and without it "Our Free Republic" is a failure. No one has ever maintained or asserted that one person, one citizen, or one "Sovereign," if you choose, has not the right to quit work, but his right stops there; it does not go so far as to say that another shall also. And here is where the strike is radically wrong, at variance with the spirit and constitution of free government.

Our Government is "of the people, for the people, and by the people"; it is not "of the unions," nor for the "federations," nor by "the associations," and can never be.

So much for the theory. Let us see what the practical teachings are. The most desperate and extensive strike occurring in this country up to date was that of 1877.

*This paper was written late in 1894.

This was participated in and originated mainly by the employes of the following railroads and their Western connections: The Baltimore and Ohio, the Pennsylvania, the Erie, and the New York Central. One hundred thousand employes and other persons are estimated to have taken part in this movement. At a preconcerted time, junction stations and other main points were seized. All freight traffic was suspended, passenger and mail service greatly impeded.

Baltimore and Pittsburgh were each the scene of a bloody riot. The presence of the militia seemed but to exasperate the rioting parties. At Pittsburgh, particularly, where the mob was most immense and furious, the militia was overcome and besieged in a round-house. An attempt was made to burn this with all its incumbents by lighting oil-cars and pushing them against it. Without harm, however, the soldiers escaped across the river. Fortunately, and at the request of the several governors, President Hayes dispatched troops to Pennsylvania, Maryland, and West Virginia.

Faced by these forces the rioters in every instance gave way without bloodshed. Meantime the torch had been applied with wonderful destruction; machine shops, warehouses, and two thousand freight cars were pillaged or burned; men, women, and children fell to thieving, carrying off all sorts of goods, parasols, coffee-mills, sewing-machines, gas stoves, whips, and kid ball-shoes; sewing-machines selling from ten cents to one dollar apiece.

The results: The destruction of property is estimated at ten millions of dollars. The Pennsylvania Railroad alone shared in this to the amount of five millions. No estimate is given of the loss to employes deprived of work; and, worst of all, some of these, with many others, lost their lives. For, in these disturbances, lasting from the 14th to the 27th of July, fourteen short days, nineteen persons were killed in Chicago, nine at Baltimore, and thirteen at Reading.

It is safe to say that three times as many were wounded as killed.

By the end of the month all, or nearly all, of the old employes had returned to work, and that at the old schedule.

Right was maintained, law was vindicated, the supremacy of the Government was acknowledged, and the strike of 1877 was chronicled a failure.

An example of the late strike in the Southwest gives evidence of disinterested and also of interested sources.

The loss to the Missouri Pacific Railway through last year's strike is placed in the annual report of the company at \$500,000, while the losses to the strikers are estimated at \$900,000, making a total of \$1,400,000.

THE CURTIN CONGRESSIONAL COMMITTEE.

Mr. Martin Irons, a conspicuous leader of these men at the time, says:

Of the 4,800 engaged in this strike, there are 4,000 of them to-day without lucrative employment.

The loss here stands in the relation of *five to nine*—wealth coming out "ahead" nearly as two to one, but the country—the whole people—with an aggregate destruction of \$1,400,000 of productive values—a shortage of the actual necessities of life to this amount.

Another phase: Take the Homestead troubles. "It was shown upon investigation that the lowest grade of workmen was receiving \$660 per year; and the next higher grade of the lowest three hundred was receiving \$3,062 per year. The wages paid the remaining workmen was still higher, the highest amounting to \$8,400 per year. They were earning from \$5 to \$25 per day, and many a man unable to write his name made his mark for one hundred dollars per week wages, owned his own home, had a good bank deposit, and kept his own horse and carriage. Compare this with the salaries of the judges, of college presidents, professors, lawyers, or clergymen."

This same authority adds: "They are the best paid mechanics in this or any other nation." I add still another paragraph from the same: "Now it was proposed by the company, regulating their scale by the condition of the market, temporarily to reduce the wages of the lowest three hundred and twenty-five $33\frac{1}{3}$ per cent. This was the occasion, but not the *cause* of the strike. These men struck, claiming that they had been wronged, and the remaining thousands having no grievance struck from sympathy and to aid in forcing the company to retract. They armed themselves, and forming in the character of a mob waged war even unto death upon the private force employed by the company to protect their property, and upon non-union men who were anxious to take their places at the reduced wages."

Again the same authority adds: "Now, what have been the results of this strike to the company, to the State, and to the strikers themselves; and what view shall we take of the whole subject with this object-lesson before us? The company has suffered the loss of \$4,000,000; the State, a loss of \$500,000 in taxes to pay a standing army for months to protect the property and rights of the corporations and the rights of the non-union men whom they had employed, and the strikers, some ten thousand in all, have lost two million dollars in wages alone, and many of them have lost lucrative positions in the rolling-mills which they voluntarily left, and the end is not yet. Scores of them are in prison awaiting trial for murder and treason, relief funds will now stop as the strike has ended, and great suffering will result to many."

Other organized efforts of laborers to maintain their rights and avenge their real or fancied wrongs are animated by the same spirit, and must result in similar consequences in a greater or less degree. The fact is their methods are wrong in principle and ruinous in practice.

Let us see how our interpretation is borne out by the interpretation of the law. Judge Paxson said in this case:

When the company shut down its works and discharged its men it was acting strictly in the lines of law; it could not compel the men to work, nor could the men compel the company to employ them; no arrangements could be made in such regard except in the nature of a contract agreed upon by the parties.

Upon these subjects the rights are mutual. The company had the undoubted right to protect its property; for this purpose it could lawfully employ as many men as it saw proper, and arm them if necessary. Many of our banks and places of business are guarded by armed watchmen. The law did not require it to employ a watchman from whom it anticipated the destruction of its works. The right of the men was to refuse to work unless their terms were acceded to, and persuade others to join them in such refusal, but the law will sustain them no further.

The moment they attempt to control the works and to prevent, by violence or threats of violence, other laborers from going to work, then they place themselves outside the pale of the law.

If we were to concede the doctrine that the employe may dictate to the employer the terms of employment, and upon the refusal of the latter to accede to them to take possession of his property and drive others away who were willing to work, we would have anarchy. No business could be constructed upon such a basis, and that doctrine when once countenanced would be extended to every industry.

The Pullman Strike, or rather boycott, brought about by the American Railway Union, when divested of all sentiment, when reduced to the facts, was first a demand upon the part of the employes to a return to wages of the first half of 1893.

This not being acceded to by the Pullman management, the American Railway Union took up the cause and declared a strike against the Pullman Company and all railroads using Pullman cars. Or, to come still nearer the truth of the matter, this was a movement to coerce the Pullman Company to pay more for the manufacturing of their goods than they would sell for in the market—or a step further, viz., to say to the Pullman Company, We will regulate your business, we will say what you shall pay us, we demand that you shall employ us and at our prices—and this with the yet still further proviso, and you shall employ no others.

The action of the American Railway Union was called "sympathetic." Did the people using this word, not newly coined, but newly used in this connection, ever think of the meaning, or at least, how little the word really meant? It seems not.

Sympathy ($\sigma\acute{\upsilon}\nu + \pi\alpha\theta\acute{\eta}\tau\iota\varsigma$), a fellow-feeling subjectively. Who ever heard of a strike being a subjective position? Was the strike upon the Pullman Company and the various railroads using the cars of Pullman a subjective or "fellow-feeling" only—was there not bloodshed? Was there not destruction of property by the millions? Were not the lives of peaceful citizens in jeopardy every hour from violence on the one hand and starvation on the other? And yet these leaders talk about peaceable, "sympathetic strikes." And for what? In order to compel the management of the corporations, if you please, to turn their property over to them.

The conclusion of the Pullman strike can be best gathered from the following quotations:

Resolved, That the Senate endorses the prompt and vigorous measures adopted by the President of the United States and the members of his administration to repulse and repress by military force the interference of lawless men with the due process of the laws of the United States, and with the commerce among the States. It is within the plain constitutional authority of the Congress of the United States "to regulate commerce with foreign nations and among the several States and with the Indian tribes," "to establish post-offices and post-roads," and to ordain and to establish inferior courts; and the judicial power extends to all cases in law and equity arising under the Constitution and laws of the United States. It is the duty of the President, under the Constitution, to "take care that the laws be faithfully executed," and to this end it is provided that he shall be "Commander-in-chief of the army and navy of the United States, and of all the militia of the several States, when called into the actual service of the United States."

It is treason against the United States for a citizen to levy war against them, or to adhere to their enemies, giving them aid and comfort.

Those who combine to use force, to assail or resist the constituted authorities of the United States, civil or military, should be warned of the magnitude of their offense, and those who earn honest bread by honest toil can do nothing more detrimental to their interest than to show them any sort of maintenance in their lawless course.

The action of the President and his administration has the full sympathy and support of the law-abiding masses of people of the United States, and he will be supported by all departments of the Government and by the power and resources of the entire nation.

(Passed July 11, 1894.)

ANN ARBOR, MICH., July 15, 1894.

PRESIDENT GROVER CLEVELAND,

Honored Sir: Now that the great strike in which your official intervention became so necessary has been clearly shown to be a failure, I beg to be allowed to express my unqualified satisfaction with every step you have taken in vindication of the national authority, and with the restoration of law and order, which has followed or is now in progress.

The caution and deliberation with which you have proceeded are, I think, worthy, like the accompanying firmness, of highest praise, and I am especially gratified that a great and valuable lesson in constitutional construction has been settled for all time with remarkably little bloodshed.

You and the Attorney-General also have won the gratitude of the country, not for this generation only, but for all time, and that God may bless you for it is the sincere prayer of

Your obedient servant,

THOMAS M. COOLEY.

Resolved, That the House of Representatives endorses the prompt and vigorous efforts of the President and his administration to suppress lawlessness, restore order, and prevent improper interference with the enforcement of the laws of the United States, and with the transportation of the mails of the United States, and with interstate commerce; and pledges the President hearty support, and deems that the success which has already attended his efforts is cause for public and general congratulation.

(Passed July 16, 1894.)

The writer a few years ago visited Pullman to see for himself what had been done there. He found a veritable magic city; an ideal wrought into a reality; a happy home, made so by the genius and forethought and business capacity of its founder. On January 1, 1881, the population consisted of four souls; that the last census shows a population of 11,000 inhabitants, that of these, that year, 1,235 were in the schools, about the usual proportion, and for instruction of these twenty-one teachers were furnished.

Next to the schools come the churches. Pullman has ten different church societies and a number of handsome church edifices. These are for the spiritually or religiously inclined. For those who

enjoy the opera, the stage, the song, and the dance, the Arcadia Theater, a commodious structure, furnished with all the modern improvements, is found. For those still who are fonder of books than either church or theater, or in addition to both of these, there is the Pullman library, containing over 8,000 volumes, together with a subscription list of over seventy papers and journals. This is the personal gift of Mr. Pullman.

A good deal has been said about the "exorbitant rents." What are the facts? The rents of the houses range from five to fifty dollars per month, the average being fourteen dollars a month. Compare these with Chicago—with any other city. But, if Mr. Pullman is to be believed, and what he has said is quoted:

One of these charges is that rents are exorbitant, and it is implied that the Pullman employes have no choice but to submit. The answer is simple: The average rental of tenements at Pullman is at the rate of three dollars a room, per month, and the renting of houses at Pullman has no relation to the work in the shops. Employes may own or rent their homes outside of town, and the building and business places in the town are rented to employes or to others in competition with neighboring properties.

The "neighboring properties" are Kensington and Roseland.

BANK AND BANK DEPOSITS.—These show unmistakably the status of a people.

PULLMAN LOAN AND SAVINGS BANK.

Organized May 7, 1883.

STATEMENT AT CLOSE OF BUSINESS, DECEMBER 31, 1892.

| | |
|---|----------------|
| RESOURCES—(not itemized to save space)----- | \$1,148,830 73 |
| LIABILITIES— | |
| Capital ----- | \$100,000 00 |
| Surplus ----- | 70,000 00 |
| Profits and Loans ----- | 21,136 15 |
| Dividends unpaid ----- | 3,000 00 |
| Deposits, Commercial ----- | 378,141 04 |
| Deposits, Savings----- | 576,553 54 |
| Total ----- | \$1,148,830 73 |

Observe that the "*Deposits, Savings*" are more than one half of the entire liabilities. Business men will pronounce this a good showing.

On May 26, 1893, there were 2,585 savings depositors. On this date their aggregate deposits being \$677,328.02, or \$265.02 as the average of each savings depositor.

Again, October 13, 1892, when there was prosperity in the country, and it is supposed that the Pullman employes were happy and should have "laid up for a rainy day," the value of the manufactured product of the car-works of the company for the year was \$10,308,939.66, and of other industries, including rentals, making a total of \$11,726,343.57. There were on the pay-rolls this year 4,942 persons, receiving as wages paid \$2,918,997.41, an average for each person employed of \$590.65.

It seems that the average for operatives a day is about two dollars for every person employed. Some mechanics earn three and some four dollars per day.

A COMPARISON.—The Michigan Bureau of Labor and Statistics, during the summer of 1891, made a canvass of 8,838 workingmen in 201 different industries in that State, and found the average annual earnings of their operatives to be \$467.02, or \$123.63 less than the operatives of Pullman, year 1892.

In a city of some thirty-five thousand inhabitants and a city claiming to be in the lead as to compensation of its educational workers, the average salary paid the teachers, and this includes the high school principal and assistants, is \$540.60 for scholastic year, or \$50.05 in favor of the Pullman employes over the teachers of the city mentioned, and with this difference, the employes of Pullman can "strike" at pleasure, the latter, the teachers, can not. And here is so curious an anomaly in the relation between the employer and employe that I must be pardoned for mentioning it, viz., in the case of the teacher the employer selects the goods and sets the price:

"Mr. —, we have this day selected you as a teacher in our schools, and you will receive — — as your salary." Should it not read thus: "Mr. —, we have this day selected you as a teacher in our schools; what compensation do you expect us to give? Please advise us at your earliest opportunity."

At Homestead the operatives received more than the presidents or professors, judges or ministers, etc.; at Pullman the operatives received more than the teachers in our best city schools.*

WATERED STOCK.—A word as to this. The Pullman Company was organized over twenty-five years ago with a capital of one million dollars. The capital has grown until its sleeping-car service covers a hundred and twenty-five thousand miles of railway, or about three fourths of the railway system of the country. This increasing service has necessitated an increase of its capital from time to time until now the capital is \$36,000,000. Every share of this has been sold to stockholders and to others in the ordinary course of business at not less than par in cash; so that the company for every share has received \$100 in cash. There are over four thousand stockholders, and of whom more than one half are women and trustees of estates. The average holding of each stockholder is now eighty-six shares; one fifth of these holding less than six shares each. Possibly some of these are the employes—if not, they should be.

EXORBITANT RATES OF THE PULLMAN CARS.—Much complaint now is heard from the people on this score, and politicians are keen to regulate and to fix their rates.

Add to this a case of gross earnings: The Pennsylvania Railroad's gross earnings, in 1891, \$47,619,280. If it had received the same rate per ton per mile as the roads of Great Britain, the gross revenue would have been \$147,252,379, or the roads of Great Britain charge three times as much per ton per mile as our roads do.

*The average price paid public school teachers, superintendents included, in the United States, 1892, was \$280 per annum. (See Statistical Abstract, 1893, page 26.)

Just here a quotation from the ablest writer upon economics in this or any country will not be amiss. Says this eminent authority: "In the period that elapsed from 1865 to 1869 the rates were considered very low, and the service was constantly improving and becoming greater and greater. Yet, low as these rates then were, had all the railroads in the United States during the last ten years been able to make a similar charge for their services, they would have earned each year for ten years a thousand million dollars (\$1,000,000,000) more than they did earn.

"The gross difference between what the railways of the United States did earn in the last ten years, and what they would have received at the rates of 1865 to 1869, comes to over ten thousand million dollars (\$10,000,000,000), and that is a greater sum than the market value of all the stocks and bonds of all the railways even before the panic depressed them." This amount in dollars consecutively placed would form a silver band girdling the earth nine and one half times. And yet some of our people still insist on "lower rates," on "regulating" or "confiscating" our roads.

ONE SOLUTION OF THESE TROUBLES.—From the relation between the operating expenses of the railroad and other charges, it is found that the employes, not counting the labor value in the outlay for the road, the rolling stock, and, in a word, for all the fixtures for operation, get from 64 to 66 per cent, and that after paying these and all other charges, the owners, the stockholders (if they get anything) get from $1\frac{1}{2}$ to 4 per cent for their part.

Now to the question: If the employes are not satisfied, why not buy up the stock of the corporations, whether of one kind or another, and control the same, and in their own way? This is not chimerical. It is business, and if the employes would at once determine to do this, they would at least accomplish one thing, a saving of their means, and that, too, without paying out, contributing to the support of leaders who must be classed, if not "blind," as those who do not see clearly what is the best for their people.

Belonging as I do to the class of wage-earners, having been an employe all my life, I do feel more than an ordinary interest in my fellow-laborers. In an address before the National Educational Association meeting in Nashville, July, 1889, after reviewing our educational status, I said: "Is there any good ground for seeming apprehension, alarm for our republic? Well, all things have not gone well during the past decade; there has been a good deal of friction. There is to-day not the very best feeling between the men who labor with their hands and the men who do not; between what I call 'work and wealth.' We school men should extend our fields of study. We should look further into matters than perhaps we are expected to, at least further than we are accredited as doing. I have told you how the equilibrium of the States can be maintained as States, as Sovereignties, and how our Union can be preserved. There must be preserved another equilibrium and that among our industries—an equilibrium of agriculture, manufacture, and commerce must be maintained. Transmutation is agriculture—Transformation is manufacture, and Transportation is commerce. That in the morbid greed for gain—the ambition to grow rich in a short time—agriculture has been neglected, the quiet fields and the lonely forests have been abandoned by too many. 'Excuses are formed for thus deserting the houses and farms of our fathers: That the cities present advantages for church and schools, and I must, therefore, move to the city for social, for church and school facilities.' There is a lack of equilibrium in these industries."

"Would I a house for happiness erect,
Nature alone should be the architect;
She'd build more convenient than great,
And doubtless in the country choose her seat."

It may not be amiss—indeed it seems to be the very thing—to show by actual facts how our country-people have sought the cities, hence the following table, taken from the United States census:

POPULATION LIVING IN CITIES AT EACH DECADE.

| Census Years. | Population of the United States. | Population living in cities. | Per cent Increase. |
|------------------|--|---------------------------------|-----------------------|
| 1790 | 3,929,214 | 131,472 | 3.35 |
| 1800 | 5,308,483 | 210,873 | 3.97 |
| 1810 | 7,239,881 | 356,920 | 4.93 |
| 1820 | 9,633,822 | 475,135 | 4.93 |
| 1830 | 12,866,020 | 1,864,509 | 6.72 |
| 1840 | 17,069,453 | 1,453,994 | 8.52 |
| 1850 | 23,191,876 | 2,897,586 | 12.49 |
| 1860 | 31,443,321 | 5,072,256 | 16.13 |
| 1870 | 38,558,371 | 8,071,875 | 20.93 |
| 1880 | 50,155,783 | 11,318,547 | 22.57 |
| 1890 | 62,622,250 | 18,235,670 | 29.12 |

Or, since 1790, while our entire population has increased sixteen fold, the city population has increased over one hundred fold.

It will also be observed that the movement from the country into the cities shows the greatest increase after 1840, that the city population in 1850 was within a trifle of twice as much as in 1840, that from this point the gain has been steady, increasing all the time.

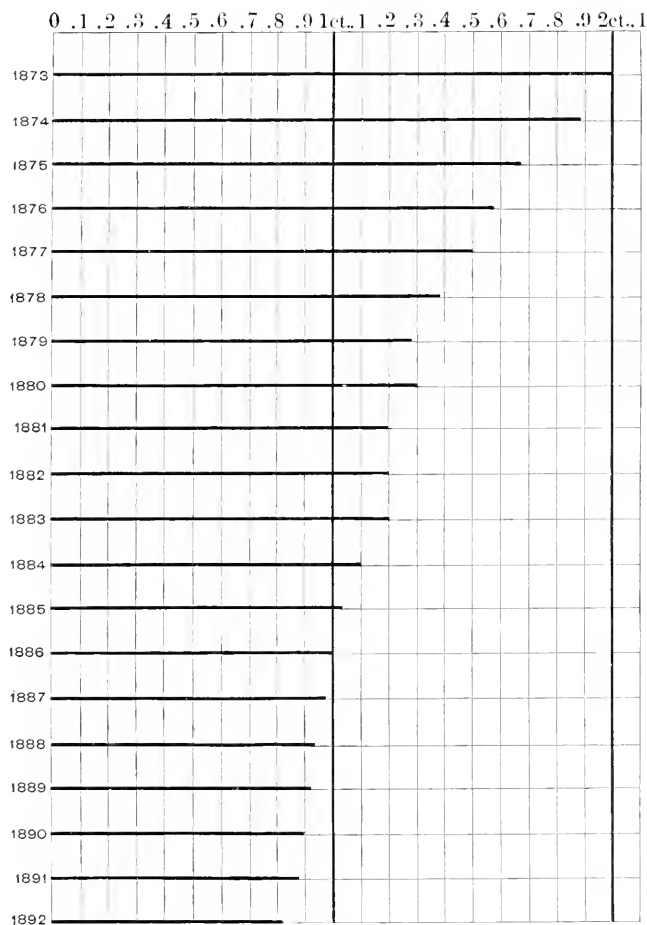
“TRANSPORTATION” AND “TRANSFORMATION.”—The railroads and the manufactories have had most to do with this “change of base.”

The desire on the part of the people generally not only to receive better prices, but definite wages—prompt reward—have caused this transfer of our people from the country to the city.

When sailing vessels carried the commerce of the world, ship-building—“following the water”—drained all the sea-coast country of its men.

The statesman, the teacher, the minister of the Gospel, and the press all should come to the rescue. What shall be done? What can be done? Make agriculture more lucrative? No; make the country home, society, church, and school privileges better, more attractive.

Fig. 1



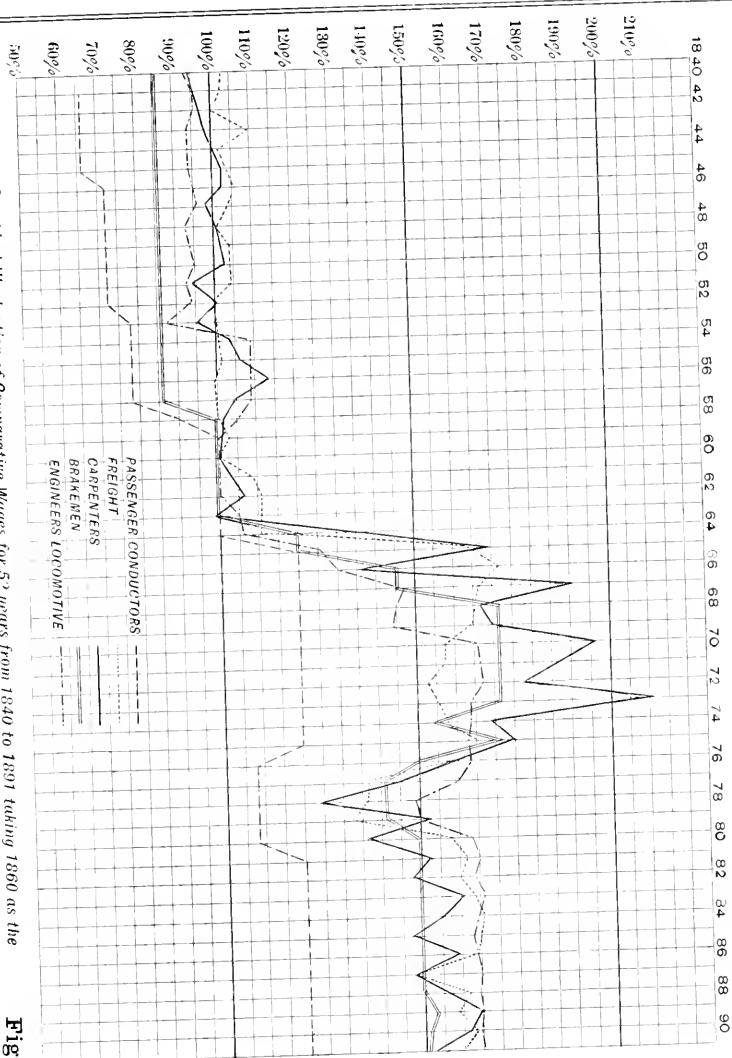
*Average Freight Charges (cents per ton per mile)
on 18 Trunk Railroads in the United States
from 1873 to 1892 Stat. Abst. of U. S. No. 16 p 280.*

But here we are met at the very threshold: "Agriculture is not remunerative." No; but agriculture is at least independent. If you can not sell at your prices, you can convert your products at home into what you can sell. Further: If you can not convert your products you can consume them, and if you can not consume all, it is better to lose a great deal of what you have than to have to purchase a little of what you have not. Operatives have to purchase everything. A peck of potatoes is dear at ten cents if you have not the *dime* to pay for them.

THE CONDITION OF THE COUNTRY. — It has taken quite a space, many years, to reach the present condition of things. Since the war particularly there have been two tendencies, and these from, or in opposite directions. For example: (See Fig. 1.)

From an examination of railroad rates or average freight charges (cents per ton per mile) on eighteen trunk railroads in the United States, from 1873 to 1892 (Statistical Abstract of U. S. No. 16, page 280), it will be seen that freight rates have decreased steadily from two cents per ton per mile, in 1873, to .799, or $\frac{8}{10}$ of a cent per ton per mile, in 1892, or a reduction of 1.2 cents, more than half on every ton, a reduction of 60 per cent; or the roads now have to carry $2\frac{1}{2}$ times as much as they did in 1873 to earn the same revenue they did then. That is, in round numbers, they must secure $2\frac{1}{2}$ times as much tonnage, and, secondly, furnish the equipment and pay the operating expenses to move it, to accomplish the same results as in 1873.

From another table (see Fig. 2.), wages for fifty-two years, from 1848 to 1891, it will be seen, wages for 1860 being 100 per cent, that in 1891 freight conductors had gone up to 159.2; brakemen (freight), to 151; brakemen (passenger), to 160; locomotive engineers, to 164.8; that railroad carpenters, in 1873, had reached 211.5, falling off, however, to 152.7 in 1891. Should these comparisons, however, be extended from 1840 to 1891, it will be seen that the first-named freight conductors went from



Graphical Illustration of Comparative Wages for 52 years from 1840 to 1891 taking 1860 as the
Standard of Comparison Taken from Senate Report No. 1394, P. 1, page 160.

Fig. 2

103.1 in 1840 to 159.3 in 1891; freight brakemen went from 85.8 in 1840 to 151 in 1891, or an advance of 77.6 per cent. Locomotive firemen advanced from 1840, 92.6 to 172.1, or an advance of 86.4 per cent.

Nor is it intended at all to convey the idea that wages are too high, but that the tariff—the remuneration to the railroads—is entirely too small. There is still another item of great expense to the railroad managements, and seems never to be thought of by the political agitator—the political “manager,”—viz.: The physiologist tells us that our entire physical make-up—our bodies—undergoes an entire renewal every seven years. This is not quite true of a railroad. It is said that the natural life of an engine is fifteen years. Iron rails, if properly cared for, will last about eight years; steel rails fifteen. The average life of ties is from four to seven years, depending entirely on the character and kind of timber, the nature of the soil in which they are laid. A box-car lasts about twelve years; passenger cars have a somewhat longer existence, about eighteen years. Add to this, however, that an engine must go into the shops for overhauling at least once a year, and that the whole rolling stock is continually in the repair shop. Pile and trestle bridges require renewing about every seven years. Wooden bridges, under roof, will last say twice as long. The life of an iron bridge, if properly cared for, will reach the age of an ordinary man. Or, the physiological life of a railroad may be put down at about sixteen years, hence the continued demands upon the management for new equipment, called by those unfriendly to railroads “watered stock.”

THE STATUS OF LABOR.—Its remuneration has been steadily upward—the products or results of labor, whether of the shop or the plowshare, the loom or the anvil, have been continually downward; or the purchasing value of a dollar has become greater and greater. This may be a partial solution of the following catastrophes—I say “partial” advisedly:

RECEIVERSHIPS IN THE FIRST SIX MONTHS OF 1894:

| | |
|----------------------------|------------------|
| Total, 23 lines..... | 2,988 miles. |
| Funded debt..... | \$121,843,000 00 |
| Capital stock..... | 138,258,000 00 |
| Total bonds and stock..... | \$260,101,000 00 |

The latter items are partially estimated.

FORECLOSURE SALES IN THE FIRST SIX MONTHS OF 1894:

| | |
|----------------------|-----------------|
| Total, 16 lines..... | 1,316 miles. |
| Funded debt..... | \$43,571,000 00 |
| Capital stock..... | 33,051,000 00 |
| Total..... | \$76,622,000 00 |

Recalling the failures and foreclosures of 1893, it will be found that in the last eighteen months ninety-seven railway companies, owning nearly 32,000 miles of road, and representing more than two billions of dollars (\$2,000,000,000), or two thousand millions of dollars, in bonds and stocks, have defaulted and been placed in the hands of receivers.

A gleam of hope, however, may be gained from the fact, terrible as it is, that the record for insolvencies for the first half of 1894 is not so bad as the first half of 1893.

Political agitation, granger legislation, the desire upon the part of some shippers to obtain concessions, not the same, but better rates than their competitors—the wish upon the part of the railroad managers to do the best possible for their patrons, and even at unremunerative figures to secure the business; the continued discussion and the final passage (1887) of the Interstate Commerce Bill, and its unreasonable demands, have all been prime factors in these disastrous results.

Of course, labor leaders have contributed their share, still in comparison with other agitators and disturbers of the labor and capital equilibrium, the latter is small indeed. The greatest factor, though negatively exercised, has been the inactivity of our

present Congress. The paralysis of business is due to their lack of prompt action upon the tariff and upon a sound financial business basis of money.

Corporations, accumulations of capital, are Nature's teachings; our country territorially extends from ocean to ocean and from the Great Lakes to the Greater Gulf.

Individual efforts must, like the individual links of a chain, be banded together. Think of building a railroad across this continent without a corporation, without the accumulation of millions of dollars and thousands of men. Capital and labor are two in one; distinct — separate in possession; united — one in action.

Another solution, and one quite popular with the politicians, is in

THE GOVERNMENT CONTROL OF THE RAILWAYS.

"The strike to-day is not for wages, not for the recognition of any association or organization. It is a strike for the control of the arteries of trade and industry."

This is the language of one of the most successful labor leaders, because he did least to destroy property and jeopardize human life.

But let us see as to the business capacity of the Government—the ability to operate railroads successfully if owned by the Government. In 1880, the deficit or loss on account of post-office expenses, a matter wholly under the control of the Government, was \$3,218,647.56. In 1893, the deficit was \$7,815,616.81. "Comment" here, indeed, is "unnecessary."

It is indisputably true that the individual working for the Government has not, in any case, the opportunity for personal advancement that he would have in working for a private corporation; if for no other reason, because of the excessive competition between all large industrial enterprises, particularly the railroads.

Competition requires that the individual shall have opportunity of developing himself. It results in employing more men and better men, in order to improve and increase the efficiency of the work performed and attract the patronage of the public. Under governmental control the necessity for improved facilities, more trains, fast trains, better track, and higher grade of equipment, now called for by reason of the excessive competition, would be withdrawn. Under governmental control it would become the duty of the Government to see that traffic passed over the lines of least resistance. In other words, between two given points the traffic would be concentrated on the shortest line over which it could move with the greatest economy, and the longer lines which now compete actively, and furnish employment for so great a number of laboring men, would be restricted simply to local traffic in territory adjacent to such lines, and absolutely dependent upon such lines for transportation facilities.

In confirmation of this, take the history of the South and North Alabama Railroad, a short division of the Louisville and Nashville system.

This road is 183 miles in length, extending from Decatur, Ala., through Birmingham to Montgomery. This line was completed and opened for operation in 1872.

Under the following classification of employes, viz., passenger and freight conductors, passenger and freight brakemen, train baggagemen, locomotive engineers and firemen, blacksmiths, boiler-makers, machinists, carpenters, and shop laborers, there was employed on this line of road, April, 1873, a total of 239 men. In 1896, this year, with the same mileage, there are employed under the same classes 1,200 men, or this little road gives to-day employment to five times as many operatives as it did twenty-three years ago.

THE TRUE SOLUTION: Must be looked for in quite a different direction.

In the presidential address before the National Bar Association, entitled *The Lessons of Civil Disorders*, Judge Cooley took occasion to say :

I wish to call attention to an obligation resting upon the members of the legal profession, and which I think goes quite beyond that which under the same state of facts would rest upon citizens in general. When, as we have lately seen, so-called industrial armies dissolve into roving vagabonds and beggars, the absurdity of their claims and pretenses makes them the subject of contempt and ridicule; but if their mischievous doctrines have taken root among any class of our people, and their demoralizing raids upon the industry of the country are likely to be repeated by themselves or others, it is not by a thoughtless and contemptuous word that the mention of them can be wisely dismissed.

Especially is this the case as regards the members of the legal profession, for a special duty rests upon them to give active and effective aid to established institutions whenever revolutionary doctrines are brought forward, or when the fundamental rights we had supposed were made secure under constitutional guarantees, are invaded or appear to be put in peril.

It is a low and very unworthy view any lawyer takes of his office when he assumes that he has nothing to do with public ignorance of the duty of subordination to the institution of organized society, or with breaches of law existing or threatened, except as he may be called upon to prosecute or defend in the courts for a compensation to be paid him.

In line with this position of Judge Cooley in reference to his profession, it seems very properly may be classed the following resolutions introduced by the writer, and unanimously adopted by the teachers of Texas (State Teachers' Association meeting in Galveston, June, 1894):

WHEREAS, For several years our social equilibrium seems to be very unstable—strikes and other evidences of dissatisfaction upon the part of one class of our citizens in opposition to another class; and, whereas, there is wider and deeper estrangement between those who labor with their hands and brains too and those who labor with their brains alone; and, whereas, this estrangement has grown into open defiance of the right and security of property and even bloodshed; therefore, be it

Resolved, First: That it is the sense of this Association that it is the duty of the teachers of this republic to at once enter upon a systematic course of instruction, which shall embrace not only broader patriotism but a more extended course of moral instruction, especially in regard to the rights and duties of citizenship, the right of property, the security and sacredness of human life.

Resolved, Second: That this Association fully realizes the responsibility, that the education of the children of this country is virtually in the hands of the five hundred thousand teachers, and that they should put into the schools, should teach the twenty-five million of pupils what they wish to appear in these children when they become citizens in order to perpetuate, to save our common country, our freerepublic.

By separate resolution of the Association these resolutions were sent to the National Educational Association (meeting, Asbury Park, July, 1894), and hence the following found in their proceedings, volume 1894, pages 32, 33:

The National Educational Association has assembled at a time of marked public disturbance and of grave industrial unrest. The highest powers of the nation have been invoked in time of peace to enforce the orders of the courts, to repress riots and rapine, and to protect property and personal rights. At such a time we deem it our highest duty to pronounce emphatically, and with unanimous voice, for the supremacy of the law and the maintenance of social and political order. Before grievances of individuals or organizations can be considered or repressed, violence, riot, and insurrection must be repelled and overcome.

Liberty is founded upon law, not upon license. American institutions are subjected to their severest strain when individuals and organizations seek a remedy for injustice, fancied or real, outside of and beyond the law. We call upon the teachers of the country to enforce this lesson in every school-room in the land, and we heartily accept and endorse the suggestion transmitted to us by the Teachers' Association of the State of Texas, that upon the schools devolves the duty of preparing the rising generation for intelligent and patriotic citizenship, by inculcating those principles of public and private morality and of civil government upon which our free republic is based, and by means of which alone it can endure.

We heartily commend the wisdom and firmness of the President of the United States as exhibited in this trying time, and we pledge to him and his associates in the conduct of the government our hearty and enthusiastic support in the enforcement of the law and the restoration of order. We must at the same time record our perfect confidence in the capacity of the American people to grapple with any social problems that shall confront them. Riot, incendiarism, and conspiracy are not native growths, but have come among us by importation. They can not long survive in the clear air of the American life.

Our people are eminently conservative, patient to a fault. It has taken many years, and the repeated violations of the rights of property and much sacrifice of human life before our people as a nation, as one man, have risen to the magnitude and danger of the strike.

But since the judiciary, as well as the executive, has clearly and unmistakably said how far the rights of both the employers and employes shall be protected; since a clear line of conduct has been marked out, it is now left for teachers and preachers, law-makers and law-expounders, for platform and pulpit and press to teach the rising, the controlling generations—to cultivate in all our citizens a broader patriotism, a higher appreciation of personal security, a greater regard for the sacredness of human life; in a word, to teach them that they have DUTIES to *perform* as well as RIGHTS to *defend*.

QUOTATIONS FOR BOTH WORK AND WEALTH.

"1. Work is a blessing, not a curse.

"2. The greatest philanthropist is he who furnishes employment to others.

"3. Aggregations of capital are beneficial to society, as they reduce the cost of production.

"4. Capital and labor are partners, but capitalists and laborers are not.

"5. Labor must choose between the certainty of wages and the vicissitudes and risks of profit and loss.

"6. Having chosen wages as its part, when wages are paid the obligations of capital cease, except such as pertain to the domain of private conscience.

"7. The obligations of capital to share profits with labor are no greater than those of others to share their surplus with the needy.

"8. No man can show authority for dictating to capital its duty to labor when agreed wages have been paid.

"9. Honesty, industry, and thrift are the basic elements of wealth.

"10. The capitalists of to-day were the wage-earners of yesterday, and the laborer of to-day can become the capitalist of to-morrow.

"11. The mounds of property are dissipated by the sure laws of nature; hence the State does not need to assist in the work.

"12. It is not a crime to acquire and own. It may be a crime not to do so if one has the ability. Acquiring must not be confounded with avarice.

"Finally: Man has an inherent and inalienable right to labor, and this right must not be interfered with by unions or strikers.

"It is not the business of government to aid in the acquisition of money or to make property, but to protect every man, the humblest and the wealthiest, in his lawful efforts to acquire and enjoy the fruits of his labor."

PART VII.

THE FAST RUNS OF THE WORLD.

Several hundred years before Homer lived, long before the Chinese philosopher Confucius was born, and nearly thirty-six

centuries before the actual accomplishment of the first telegraph line (May 27, 1844), between Baltimore and Washington, Job wrote:

Canst thou send lightnings that they may go and say unto thee, here we are?

The messenger to the railroad is just as important as the motor, and came

within the remarkably short period of sixteen years after the first rail was laid; it has been developed and perfected along with the railroad until truly *Their line has gone out through all the earth, and their words to the end of the world.*

It is just as necessary to know "here we are" at the expected moment as it is to know "others are not here."

Hence, as said before: "The dispatcher who sits at his table with fifty—a hundred and fifty—trains on the road has more responsibility every way than the general who directs an army."



1874—Just thirty years after the telegraph, we have the telephone, and to writing at a *distance* is added, talking at a *distance*.



"This electric chain from East to West,
More than mere metal, more than Mammon can,
Binds us together—kinsmen in the best;
Brethren as one; and looking far beyond
The world in an electric union blest."

Without the wires there could be fast trains, high speed, but the exact records would be wanting.

For a time nothing was heard of "breaking the record," except occasional spurts, the New York Central holding the proud distinction "THE WORLD'S FASTEST TRAIN,"

until August 22-23, 1895, when the London and Northwestern (West Coast Route) gave to the world that for 539.75 miles it had sustained an average speed, including stops, of 63.24 miles an hour; excluding stops, 63.93 miles an hour, or better than the New York Central (in second average) by 2.43 miles per hour.

On September 11th, within nineteen days, the New York Central made another run, over the accustomed route and in the same direction, from New York City to East Buffalo, averaging, running time, 64.22 miles an hour, thus regaining her former distinction by .29 of a mile an hour.

In a dispatch sent out, giving this extraordinary performance, it was stated that: "The prevailing west wind retarded the '999' and she did not make her accustomed speed." With this hint I wrote the following, which was sent to *The Railroad Gazette*, September 19th, but did not appear until December 20th:

Much has been printed and published lately about "fast runs," notably, 1891, the great run of the New York Central and Hud-

son River Railroad, in which the actual running time was $436\frac{1}{2}$ miles in 425 minutes and 42 seconds, or an average of $61\frac{1}{2}$ miles an hour. The weight of this train was 460,000 pounds.

Since that run, the English railroads have been racing with themselves and have beaten this wonderful performance. August 22d, 23d, the London and Northwestern ran 540 miles in 512 minutes, inclusive of all stops; this was equal to 63.27 miles per hour.

The New York Central, on September 11th, this year, made the remarkable run of the same $436\frac{1}{2}$ miles in $407\frac{2}{3}$ minutes, an average of 64.24 miles per hour, or better than the English railroad by nearly one mile per hour.

Now to the point in this comparison: The New York Central, in starting both times from New York City, unnecessarily retarded its own speed.

First. While the Hudson River is a "water level," it does run "down hill"; the train, therefore, from New York to Albany ran "up grade," and hence did not make as good time as it would have made from Albany to New York.

Second. From Albany to Buffalo, due west, the train encountered not only "the prevailing west wind," but the force of the earth's revolution eastward. This latter force, possibly, will not be so readily admitted by the general reader, and seems not to have been considered at all by the managers of the New York Central. Now, therefore, to the proof:

According to the doctrines of Mechanical Philosophy, viz.: "Owing to the diurnal rotation of the earth, bodies at the equator press toward the earth with $\frac{3}{889}$ of the pressure they would exert were the earth deprived of its rotation. If, therefore, the rotation of the earth could be accelerated until it took only $\frac{1}{17}$ of the present sidereal day to make a complete turn or revolution, the centrifugal tendency would be increased seventeen-square (17^2) fold; that is, it would be 289 times as great as now, and bodies at

the equator would have no pressure downward, or, as we say, would weigh nothing. This rate of revolution would not be sufficient to deprive bodies anywhere else of their weight."

Confirmatory of this doctrine a few formulæ and reductions are introduced.

It is also taught in Mechanical Philosophy that a body or mass M moving with a velocity V in a circle of radius R , has a centrifugal force represented by, or is $= \frac{M V^2}{R}$ (1).

That the gravity or weight of a body is represented by, or is $= M g$ (2).

Now, to find what fraction the centrifugal force is of the gravity or weight we divide (1) by (2) and we have $\frac{V^2}{R g}$.

If we apply this formula to bodies at the earth's equator, and "at rest" there, that is, moving only as fast as surrounding objects, trees, rocks, etc., we must make V = velocity of diurnal rotation there, R = equatorial radius of earth, and g = equatorial gravity, acceleration; this will give us by reduction $\frac{V^2}{R g} = .219$ nearly.

Here V = velocity of earth, 1,530 feet per second;

R = equatorial radius of earth, 21,120,000 feet nearly;

g = 32, nearly, gravity.

Hence by substitution and reduction we have the result $.219$, nearly.

Now, a train moving east with a velocity v has a velocity $(V+v)$ relative to the earth's center, and hence for it the lightening of its weight would be $\frac{(V+v)^2}{R g}$ while if it were moving west with the same speed it would have its velocity relative to the earth's center $V-v$ and $\frac{(V-v)^2}{R g}$ would be "the lightening."

The algebraic difference of the two would be the fractional increase of pressure downward due to reversal of velocity of same body from east to west $= 4 \frac{V v}{R g}$.

Taking a train running say 70 feet per second, or nearly 48 miles per hour, this fraction would not be far from $\frac{1}{1600}$ part of the weight of train; and if running 60 miles an hour (88 feet per second) it would be $\frac{1}{280}$ part; if 100 miles an hour (146.66 feet per second) it would be $\frac{1}{68}$ nearly; and it would be greater and greater as the speed is increased.

This calculation, it will be observed, will be true for the equator.

The New York Central train ran from Albany to Buffalo, upon about the 42d parallel of latitude.

If therefore the case is transferred to the point, P , in latitude, $PCE = \theta$, the velocity due to the earth's rotation is reduced in the ratio of EC to PD , that is, it is $= V \cos. \theta$.

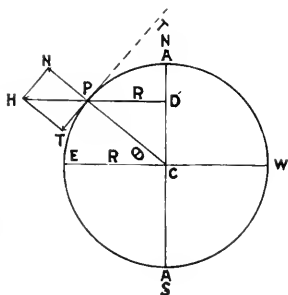
The radius of the diurnal circle is reduced in the same ratio and is $= R \cos. \theta$.

It is easy to see, in addition to these changes, that while the centrifugal force at the equator is vertical, at P it is not so, being straight from D in a line PH . Hence we must take only the vertical component at P or multiply the total centrifugal force at P by the *cosine* of the latitude of P .

From these three circumstances it results finally, that the fractional increment of pressure due to reversal of velocity of train from east to west would be $4 \frac{V^2}{Rg} \cos. \theta$, V and R being equatorial values.

Therefore, above and below the equator a correction must be made dependent upon the *cosine* of the latitude.

In the case of the New York Central, latitude about 42 degrees, the *cosine* is .742950, or nearly $\frac{3}{4}$, and the formula would be $3 \frac{V^2}{Rg}$.



LONDON AND NORTHWESTERN, NEW YORK CENTRAL, LAKE SHORE
AND WABASH RAILROAD.

| | West Coast, London to Aber- deen. | N. Y. Central, New York to East Buffalo. | Lake Shore, Chicago to Buffalo. | Wabash, Peru to St. Louis. |
|----------------------|---|--|---------------------------------------|----------------------------------|
| Date, | August 22-23, 1895. | September 11, 1895. | October 24, 1895. | November 2, 1895. |
| Weight of cars, . . | 150,080 lbs. | 361,000 lbs. | 304,500 lbs. | 239,800 lbs. |
| Distance, miles, . . | 539.75 | 436.32 | 510.1 | 282.4 |
| FIRST STAGE. | | | | |
| Length, miles, . . . | 158 | 142.88 | 87.4 | 101.3 |
| Departed, | 8:00 P. M. | 5:40:30 A. M. | 3:29:27 A. M. | 10:47:50 A. M. |
| Arrive terminus, . . | 10:27:30 P. M. | 7:54:55 A. M. | 4:54:53 A. M. | 12:27:20 A. M. |
| Time, | 2 h. 27 min. 30 sec. | 2 h. 14 min. 25 sec. | 1 h. 25 min. 26 sec. | 1 h. 37 min. 58 sec. |
| Speed, m. p. h., . . | 64.27 | 63.79 | 61.38 | 62.04 |
| Engine, | No. 1309 compound | No. 870 | No. 597 | No. 604 |
| SECOND STAGE. | | | | |
| Length, miles, . . . | 141.25 | 147.84 | 133.44 | 71.6 |
| Departed, | 10:30 P. M. | 7:50:45 A. M. | 4:57:04 A. M. | 12:30:20 P. M. |
| Arrive terminus, . . | 12:35:30 A. M. | 10:17:10 A. M. | 7:01:30 A. M. | 1:33:38 P. M. |
| Time, | 2 h. 5 min. 30 sec. | 2 h. 26 min. 25 sec. | 2 h. 4 min. 35 sec. | 1 h. 3 min. 18 sec. |
| Speed, m. p. h., . . | 67.50 | 63.17 | 64.24 | 67.8 |
| Engine, | No. 904 | No. 999 | No. 599 | No. 604 |
| THIRD STAGE. | | | | |
| Length, miles, . . . | 150.00 | 145.60 | 107.8 | 109.5 |
| Departed, | 12:38 A. M. | 10:19:35 A. M. | 7:04:07 A. M. | 1:35:10 P. M. |
| Arrive terminus, . . | 3:07:03 A. M. | 12:32:26 P. M. | 8:50:13 A. M. | 2:17:40 P. M. |
| Time, | 2 h. 29 min. 30 sec. | 2 h. 12 min. 51 sec. | 1 h. 46 min. 6 sec. | 1 h. 40 min. 14 sec. |
| Speed, m. p. h., . . | 60.20 | 65.75 | 60.90 | 65.4 |
| Engine, | No. 90 | No. 903 | No. 160 | † No. 602 |
| FOURTH STAGE. | | | | |
| Length, miles, . . . | 90.50 | .. | 95.5 | .. |
| Departed, | 3:09:30 A. M. | .. | 8:51:58 A. M. | .. |
| Arrive terminus, . . | 4:32 A. M. | .. | 10:17:30 A. M. | .. |
| Time, | 1 h. 22 min. 30 sec. | .. | 1 h. 25 min. 32 sec. | .. |
| Speed, m. p. h., . . | 66 | .. | 66.99 | .. |
| Engine, | .. | .. | No. 598 | .. |
| FIFTH STAGE. | | | | |
| Length, miles, . . . | .. | .. | 86 | .. |
| Departed, | .. | .. | 10:19:48 A. M. | .. |
| Arrive terminus, . . | .. | .. | 11:30:34 A. M. | .. |
| Time, | .. | .. | 1 h. 10 min. 46 sec. | .. |
| Speed, m. p. h., . . | .. | .. | 72.91 | .. |
| Engine, | .. | .. | No. 564 | .. |
| THROUGH. | | | | |
| Distance, miles, . . | 539.75 | 436.32 | 510.1 | 282.4 |
| Time elapsed, . . . | 8 h. 32 min. | 6 h. 51 min. 56 sec. | 8 h. 1 min. 7 sec. | 4 h. 30 min. 40 sec. |
| Average speed, . . | 63.24 | 63.54 | 63.61 | 62.6 |
| Time in motion, . . | 8 h. 25 min. | 6 h. 47 min. 41 sec. | * 7 h. 50 min. 20 sec. | 4 h. 21 min. 27 sec. |
| Average speed, . . | 63.93 | 64.22 | 65.07 | 64.8 |

* Two minutes and five seconds deducted in third stage, actual stop by flag.

† Stop of one minute and thirty-two seconds at Attica for water.

‡ Four minutes and thirty-five seconds delay in changing engines at Decatur and Tilton.

• Stop of two minutes and sixteen seconds at Litchfield for water.

Still it would seem that the next time the New York Central races with itself it should be from Buffalo to New York City.*

The Lake Shore and Michigan Southern made its run last—made it from Chicago to Buffalo, 510.1 miles, in the unprecedented time, including stops, 8 hours 1 minute and 7 seconds—an average of 63.61 miles per hour; excluding stops, at the rate of 65.07 miles per hour, thus winning the world's record and beating the New York Central by .85 of a mile, and the distance run being 73.88 miles farther than that of the Central.

The Lake Shore ran from *west to east with the centrifugal force of the earth*. This run means breakfast in Chicago and supper in New York.

Means still more: *That the distance from ocean to ocean will soon be traversed in as many minutes as there are intervening miles.*

The Western and Southern roads have not entered so generally into these fast-run contests, still the time made by many of them should be recorded, furnishing proof positive of superior power, superior roadbed, and superior management.

KNIGHTS OF PYTHIAS TRAIN.

The longest fast run in the world, 780.9 miles in 15 hours and 49 minutes, was made from Jacksonville, Florida, to Washington City, August 26, 27, 1894. Some passengers, after stopping off at Washington 36 minutes, boarded a regular train and arrived in New York 2.30 p. m., being only 22 hours and 10 minutes from Jacksonville.

When it is recollected that this run was made over seven separate divisions of railroads, through a region everywhere intersected with bridges and trestles, thirteen railroad crossings

*NOTE—Of course the earth is not a sphere. It is an ellipsoid, and this presentation leaves out many details that should appear in a thorough scientific discussion of the subject. Such details would, however, only slightly modify the numerical results we have given, and are therefore purposely omitted. In these great contests the most helpful agent would be "the prevailing wind," and hence a consultation with the weather bureau is suggested.

requiring full stops besides the stops for changing engine and taking water, one is prepared to appreciate the comment of the Charleston News and Courier: "If the special had pulled out of Jacksonville just as day was breaking it would have run across the long bridge in Washington just before the electric lights were turned on." Or, if it had run in winter, in 22 hours and 10 minutes—through 15 degrees of latitude—these Knights would have exchanged balmy Florida for icy New York.

NOTE—Longest stop for water, five minutes; fastest mile made, 48 seconds, or 75 miles per hour.

THE TIMES SPECIAL TO ATLANTIC CITY, PENNSYLVANIA
RAILROAD, APRIL 21, 1895.

| | H. | M. | S. |
|----------------------------|----|----|----------|
| Left Camden Station..... | 5 | 35 | 45 A. M. |
| Reached Atlantic City..... | 6 | 21 | 30 A. M. |

Running time, 45 minutes and 45 seconds; average speed, 76.5 miles per hour.

| | Average speed per hour. |
|---|-------------------------|
| Between Liberty Park and Absecon, 49.8 miles..... | 79.7 miles. |
| Between Berlin and Absecon, 35.6 miles..... | 82.9 miles. |
| Between Thurlow Junction and Absecon, 24.9 miles..... | 83.0 miles. |

The fastest one mile made was 87.8 miles per hour.

The average speed of the Times Special was 76.5 miles per hour.

The Pennsylvania celebrated its golden jubilee April 13, 1896. The proceedings show that the company moved in 1852, 70,000 tons of freight; in 1895, 160,000,000 tons. It carried also 75,000,000 passengers. The pay-roll in 1852 was less than \$400,000; to-day it amounts to \$36,000,000.

It controls to-day 9,000 miles of road. The present equipment would form a train extending from New York to Chicago. The aggregate capital is \$834,000,000, the number of employes over 100,000, and over 500,000 people are dependent upon this corporation for their daily bread. This development is a fair measure of the prosperity of this country.

PUNCTUALITY—ON TIME.

To be "on time" is the first requisite of a good pupil. In the month of January, 1895, the Chesapeake and Ohio Railway made the following remarkable record:

No. 1 left Washington on time, . . . 31 times. Arrived at Cincinnati on time, 24 times.
Arrived at Cincinnati 10 to 30 minutes late, . . 7 times.

(MADE BIG FOUR CONNECTIONS.)

No. 2 left Cincinnati on time, . . . 31 times. Arrived at Washington on time, 30 times.
Arrived 50 minutes late, 1 time.
No. 3 left Washington on time, . . . 23 times. Arrived at Cincinnati on time, 28 times.
Left Washington 15 to 40 min. late, 7 times. Arrived at Cincinnati 2 hours late, 2 times.
No. 3 left Washington 1 hour late, . . 1 time. Arrived at Cincinnati 6 hours late, 1 time.

(MISSED BIG FOUR CONNECTIONS.)*

No. 4 left Cincinnati on time, . . . 31 times. Arrived at Washington on time, 29 times.
Arrived at Washington 15 to 30 min. late, . . . 2 times.

* Heavy snow-storm and mercury below zero.

Number of trains, 124. Initials and terminals, 248. Route length, 600 miles. Distance traversed, over a long stretch of mountainous country requiring, for most of the way, two engines, *seventy-four thousand and four hundred miles* for the month, making 95 per cent of terminal connections.

This year, during the months of March, April, May, and June, for 122 days, 488 trains, the vestibuled limited "F. F. V.," in the run between Washington and Cincinnati, made a still more remarkable race. Each train covered 600 miles 122 times, or a total of 292,800 miles, or nearly twelve times around the earth, the four trains being on time 463 times out of a possible 488, an average, again, and for four months, of 95 per cent.

These extraordinary achievements are the result of three perfections: Perfection of track, perfection of equipment, and perfection of management.

In connection with fast trains and telegraphing the following digression seems appropriate:

"DREW THE WRONG LEVER."

(ALEXANDER ANDERSON.)

This is what the pointsman said, with both hands at his throbbing head:

"I drew the wrong lever standing here, and the danger signals stood out clear;

But before I could draw it back again, on came the fast express, and then—

Then came a roar and a crash that shook this cabin floor, but I could not look

At the wreck, for I knew the dead would peer with strange dull eyes at their murderer
here."

"Drew the wrong lever!" "Yes, I say! Go, tell my wife, and—take me away!"

That was what the pointsman said, with both hands at his throbbing head.

O, ye of the nineteenth century time, who hold low dividends as a crime,

Listen. So long as a twelve hours' strain rests like a load of lead on the brain,
With its ringing of bells and its rolling of wheels, drawing of levers until one feels

The hands grow numb with a nerveless touch, and the handles shake and slip in
the clutch,

So long will ye have pointsmen to say—"Drew the wrong lever! take me away!"

WHY THIS STRANGE ACTION?

Says Dr. Carpenter: "Wherever a distinct nervous system can be made, it consists of two different forms of structure—the presence of both of which, therefore, is essential to our idea of it as a whole 'Thus man, the nervous system of animal life,' consists of the brain and spinal cord, which are aggregations of ganglia, and of the trunks and branches that proceed from them. In addition to this he has also a 'nervous system of organic life'—the ganglionic centres of which are scattered through the body. In both systems the trunks are essentially composed of *nerve-fibres*; whilst the ganglionic centres are characterized by the presence of peculiar cells connected with these fibres.

"It is easily established," says he, "by experiment that the active powers of the nervous system are concentrated in the *ganglia*, while the trunks serve as conductors of the influence which is to be propagated towards or from them

"The nerve-fibres which convey from the various parts of the body to the ganglionic centres those impressions which there excite sensations are called *afferent* or *excitor*. On the other hand, the nerve fibres which convey from the ganglionic centres to the muscles the impressions which call forth contractions in the latter are called *efferent* or *motor*. It is probable that the nature of the nerve-force excited in each is the same; so that the same fibre might serve either purpose, if its terminals enable it to do so—just as the same wire in an electric telegraph can convey an electric current in either direction, and can thus serve alike for the transmission of a message and for its reply."

In this discussion, then, let it be granted that the brain is

THE GREAT CENTRAL STATION

to which the *afferent* nerves convey all the messages and impulses

that come to us from outward sources. From this same station the *efferent* nerves conduct messages, impelling action to all parts of the body. While the brain is the great supervising and controlling center of the nervous system, there are other centers, aggregations of ganglionic nerve cells situated in various parts of the human body, which play an important part in the nervous mechanism of our being. These lesser centers have specialized functions and preside over limited areas and within limitations; their mechanism is the same as that of the higher center. They are intimately connected with and related to one another and communicate with the parent center, the brain. They preside over the involuntary movements of the body and thereby relieve the higher centers of an immense amount of actual work.

Their intimate and intricate connection with one another and the higher centers of the brain present an immense area of reflexes, all of which are necessary to our well-being. These reflexes are influenced by various stimuli and functions normally and abnormally in direct accord with the stimulation received. Afferent and efferent impulses travel in the line of least resistance, and repetition soon establishes habit.

Disturbance of the usual route leads to a more circuitous one, thereby increasing the factor of time and lessening the potential of the impulse. Counter-impulses become a factor, and their influence determines the resultant. Hence in the case of the switchman repetition had reduced his work to habit. Long training had converted the mental process to its simplest form; it had become little else than a simple reflex, taking its shortest route and exerting the lowest degree of stimulation upon the centers of higher consciousness. Another impression knocked at the door of his inner-consciousness, its stimulation exceeded that of the old one, the two forces contended with each other, and the efferent impulse "*threw the switch the wrong way.*"

PART VIII.

THE ST. LOUIS UNION PASSENGER STATION.



The tourist, whether for health or pleasure, visiting Salt Lake City first goes to the great tabernacle. At once he is amazed at this immense structure; begins to examine and to determine for himself how this dome, under which can be comfortably seated 12,000 worshipers, is sustained. He finds that this roof is an ellipsoidal curve—of Howe truss construction—rafters four-tier

deep, all doweled with wooden pins, not an iron bolt to be found. That this dome rests upon forty-four sandstone pillars, piers, or abutments. This structure—its architecture, its capacity, and its adaptability to the purpose for which it was constructed—has been for years the admiration not only of the Western Continent but all travelers.

In the city of St. Louis, Saturday, September 1, 1894, was opened the largest railway station in the world.

The excavation for this structure was commenced April 1, 1892; the corner-stone was laid July 8, 1893. On account of the nature of the ground, the present site not more than fifty years ago being a part of the old Chouteau Pond, it required to complete the foundation walls fifteen months; the whole, however, being finished and ready for occupancy in the remarkably short period of two years and five months.

The station proper, the head-house and the midway between it and the train-shed, and the train-shed itself, occupy an area of 497,970 square feet, or eleven and one tenth acres. The yards just south of the train-shed, between it and the power-house, contain 465,970 square feet, making a total area for the Union Station itself, exclusive of all main track approaches, of 963,962 square feet, or 20 acres.

The area covered by the four main tracks, reaching from the tunnel to the grand avenue, including the proposed storage yard on Compton Avenue, all of which is set aside for passenger service exclusively, is 867,098 square feet, making a grand total of 1,830,160 square feet, or 42 acres.

There are 19 miles of track in this system, of which the 30 tracks under the train-shed compose $3\frac{1}{2}$ miles. The interlocking system is worked by 122 levers, and controls 130 switches and 103 signals. The electric light plant has a capacity of lighting 300 arc and 5,000 incandescent lights. The heating apparatus has a capacity to supply 44,500 square feet of radiating surface, amply

sufficient for the station proper, the express and baggage building, and all other buildings appurtenant to the station. The cost of the site, the buildings, and the entire system of tracks and other improvements, amounts to \$6,500,000.

While the whole is unsurpassed in architectural beauty and is a marvel of adaptability, there are about it facts that claim more than an ordinary mention. The train-shed is 601 feet wide from center to center of outer columns, covering 30 tracks, and 700 feet long from wall of head-house to center of end columns. Of this length 70 feet is an auxiliary shed covering the wide transverse platform and connecting the head-house with the train-shed proper, the main front of the latter being therefore 630 feet long. The height to center pin of the top cover of middle span at the head-house end is 74 feet, and the height of end pins of bottom chord of side trusses, 20 feet. The total width of 601 feet is made up of a center span of 141 feet 3½ inches, two flanking spans of 139 feet 2¼ inches each, and two side spans of 90 feet 8 inches each. The side columns are placed 30 feet apart from center to center, longitudinally, while the columns of the three interior rows are placed 60 feet apart. The roof trusses are 30 feet apart, every alternate truss resting on the longitudinal girder carried by the columns. Under the dome of the great tabernacle 12,000 worshipers could be comfortably seated; allowing the same space to each person, under the roof of the train-shed of the St. Louis Union Station 134,624 could be comfortably seated, or nearly twelve times as many.

The arch form has been almost universally adopted for large stations. The largest single arch is the Pennsylvania Station at Philadelphia, constructed subsequent to the St. Louis shed, and has a width of 300 feet. The St. Louis shed is not supported by arches at all but by five trusses across the width, but so formed as to preserve the effect of the arch and yet not be so high as to dwarf the head-house. A central ventilator runs the full length of the

building on the top, having a width of 50 feet, and is covered by a glass roof. From both sides of the central ventilator running down the slopes of the roof are clear stories, 30 feet in width and 10 feet in height, and spaced 30 feet in the clear part, in the sides of which clear stories are ventilators and glass lights.

The sides of the central ventilator between the clear stories are also provided with slats. It will be seen, therefore, that from any direction the wind may blow, its effect will be to carry the smoke out of the building.

A few comparative figures:

| | | |
|--|------|-----------------------|
| St. Pancras, London | 243 | feet wide, 10 tracks |
| *Grand Central Station, New York | 200 | feet wide, 12 tracks. |
| New Pennsylvania Station, Jersey City | 256 | feet wide, 12 tracks. |
| New Pennsylvania and Reading Station, Phila .. | 266½ | feet wide, 13 tracks. |
| New Pennsylvania Station, Philadelphia | 304 | feet wide, 16 tracks. |
| Union Passenger Station, Frankfort-on-Main ... | 552 | feet wide, 18 tracks. |
| New Union Station, St. Louis..... | 606 | feet wide 30 tracks. |

It surpasses the great stations of London, New York, Boston, and Chicago. So stupendous an undertaking as this had to be backed and directed by immense capital. Hence, the question of first importance, Who supplied the money? The Terminal Railroad Association, composed of and controlled by the Cleveland, Cincinnati, Chicago, and St. Louis Railroad, the Louisville and Nashville, the Missouri Pacific, the Iron Mountain and Southern, the Wabash, and the Baltimore and Ohio Southwestern, each of these roads having a representative in the Board of Directors.

As the Association stands to-day, the properties owned or operated by it are the St. Louis Bridge, the Tunnel Railroad of St. Louis, the St. Louis and East St. Louis Terminal, and through other arrangements, the St. Louis Merchants Bridge and Terminal.

*The New York Central has a smaller shed also, covering 7 tracks, making a total of 19 tracks.

When it is recollected that three fifths of the territory of the United States is west of the Mississippi River, and the rapid strides that this part of our country has made within the last quarter of a century in agricultural and commercial progress, it is not surprising that to-day is found for the business of transportation the largest, the handsomest, and the best adapted passenger station in the world, and that, too, at the gateway of the great West.

While due mention of and befitting tributes were paid to all the officials, to all the artists and artisans, to all who had lent their skill and management to secure this unparalleled success, in all the ceremonies and speeches there seemed to be a wish to mention, to honor particularly, the President of the company.

This wish, this distinction, and this tribute is best set forth in the language of one of the prominent speakers:

There is one other reason, too, that brought me here, and that is the great affection and respect I have for the President of this Terminal Association, your fellow-citizen, Dr. Taussig. To him is due the conception and the carrying out of this great enterprise. The rest of us have supported him, but he has been the leader. Twenty-five years ago, a quarter of a century, he commenced, and to-night the work is finished. I know that the poet tells us that "the fairest things are those of which we dream," but I hope this is not true with our good friend, but that he enjoys the fruition more than the expectation. This is his monument, but he has one even better, for time will efface even the memory of the man who built so noble a structure as this, and the great multitude in future years will pass on and forget even the name of the projector; but in the hearts of his friends and fellow-citizens in St. Louis he will live when this grand structure shall have become faded and worn, and be surpassed by one better, even as this now takes the place of the old one. He has lived with you nearly half a century, and in that time been a faithful, conscientious, and honest citizen. What greater honor ought any man to ask, and what more can he have? In behalf of the railways I congratulate him to-night on this building, and on the completion of this step in his life-work. I congratulate him much more in the fact that his life has been spent among a people and in a city that appreciates him, and where his memory will be held in kindly regard.

This celebration fell on more than an anniversary, it was an epoch really; it marked precisely the twenty-fifth milestone of Dr. William Taussig's connection with and service for the Terminal Railroad Association.

THE GIFT OF MR. JAMES J. HILL.

The gifts to colleges and universities by railroad men in the East—in the Middle States, upon the Pacific Coast—have been chronicled. Now is presented another, and in the far Northwest:

Monday, September 4, 1895, witnessed the beautiful inauguration ceremonies of THE ST. PAUL SEMINARY. September skies smiled auspiciously on the dedicatory exercises. It was a cloudless day, and it had all the charms of summer without the discomfiture of extreme heat. When the hour arrived for the opening ceremonies twelve thousand people were present on the grounds.

They had come to attest their appreciation of and faith in the new institution of learning about to be launched—the gift of their fellow-townsmen, their beloved citizen, James J. Hill.

Mr. Hill, as a citizen of many years of the Northwest, saw the necessity of such an institution, an institution that should have distinctively for its mission the upholding of good citizenship upon Christian foundations, and gave for this purpose and for this seminary \$500,000. The aims and objects of this institution are set forth in the address of one of the leading speakers:

Patriotism is a religious virtue; good citizenship is the practical application through life of Christian ethics. The test of the deep religious instincts of the seminary and of the power of its ethical teaching be, in the years to come, the patriotism and the good citizenship which it will practice and inculcate; the patriotism and the good citizenship which its students will bear away with them over the land to practice and to inculcate in their own homes.

The country has no greater need than that of men who by correct thought and courageous heart are pillars of the social order, who know rights in duties, and duties in rights, who sway neither to one side nor to the other, holding themselves sternly on the lines of law and principle. Be it the special mission of St. Paul's Seminary to enrich with such men our America. America! be thine this Seminary.

It is said Mr. Hill was greatly affected. His voice trembled while he spoke:

The present occasion is to me a very pleasant one. I am called upon to-night to perform the final act in an undertaking which has for three or four years occupied much of my time and thought.

After recounting many other reasons for his action, he gives the last, the greatest, and at the same time a most beautiful and befitting tribute to woman:

Some of you may wonder why I, who am not a member of your church, should have undertaken the building and endowment of a Roman Catholic theological seminary, and you will pardon me if I tell you plainly why. For nearly thirty years I have lived in a Roman Catholic household, and daily have had before me and around me the earnest devotion, watchful care, and Christian example of a Roman Catholic wife, and of whom it may be said, "*Blessed are the pure in heart, for they shall see God,*" and on whose behalf to-night I desire to present and turn over to the illustrious archbishop of this diocese the seminary and its endowment as provided in the deeds and articles of trust covering the same.

After the acceptance of this gift upon the part of the archbishop, another gift by Mrs. Hill was presented; and, while not costing so much, is of infinite value to the institution—the gift and unfurling of the stars and stripes, our Country's Flag, and that, too, while the vast audience sang:

My country, 'tis of thee,
Sweet land of liberty,
Of thee I sing;
Land where my fathers died,
Land of the pilgrims' pride,
From ev'ry mountain side
LET FREEDOM RING.

The institutions of to-day can not ignore the trinity of the civil, natural, and social sciences.

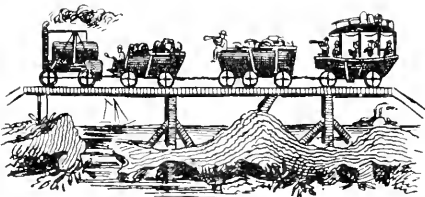
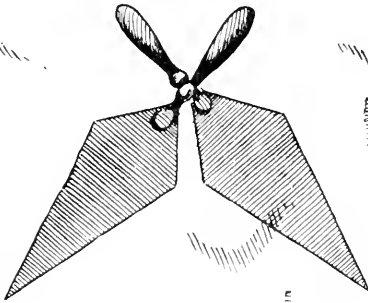
Young men trained for the ministry of the church can not and should not forget, whether during the years of their training or later on during the time of their ministry, that they are bound by the requirements of their office to foster and to uphold by word and deed the highest and purest citizenship—the most exalted Christian character.

The buildings consist of a dormitory building, recitation building, administration building, refectory building, and gymnasium building, all situated upon a lovely eminence, in the midst of a beautiful grove—another ACADEMUS, but upon the Western Hemisphere.

PART IX.

THE EVOLUTION OF THE BALTIMORE AND OHIO RAILROAD.

In commemoration of laying the Corner Stone of the
BALTIMORE AND OHIO RAILROAD, by CHARLES
CARROLL of Carrollton, in the 92d year of his age.



JULY 4th
1828

While the Simplon Tunnel, under consideration for twenty-seven years, but now building through the Alps, connecting the Swiss Railway terminus at Briqure and the Italian terminus at D'Ossola, twelve and a half miles, and to cost \$13,500,000 when completed, is the most gigantic undertaking of its kind, still the tunnel built by the Baltimore and Ohio Railroad to connect their main line with their Philadelphia Division is of so much more importance to us that it is worth while to give quite a description of it.

This tunnel, started September 13, 1890, was opened for traffic May 1, 1895, within the short period of four years, seven months, and eight days.

The Belt Line, of which the tunnel is a part, is 7.2

miles long (the tunnel proper being 7,340 feet). This work gave employment to 2,400 men, and cost the company \$7,000,000. This was a triumph of science and skill, an evolution marking a distinct era in the world's progress

FROM HORSE POWER TO STEAM, FROM STEAM TO ELECTRICITY.

For many years the cars, both freight and passenger, of this company were drawn through the city by horses, ten or twelve to each car, driven *tandem*. The jingling of bells and the shrill whistle of the driver's bugle gave notice of the approach of this strange spectacle to the visitors of the city.

From the circuitous street route, the more circuitous one of a ferry from Locust Point to Canton was adopted. This was tedious and unpleasant to the traveling public, as well as slow and costly in the movement of freight—the other roads had their through connections, and the Baltimore and Ohio suffered by comparison. But the management rose to the magnitude of the situation, and built the tunnel at a cost of "seven millions of dollars."

Says one of the officials: "You understand, of course, that our main object in using electric motors through the tunnel is to relieve our passenger trains of the annoyance of gas and smoke engendered by passing trains. We can build locomotive engines powerful enough to pull through the tunnel any train that we can haul outside of it. The gain to the traveling public through the use of the electric motor is in the exemption from the annoyance of engine smoke and gas while passing through the tunnel."

This enterprise, gigantic as it was, demonstrated two important points:

First, that the Baltimore and Ohio was determined to keep apace with the demands of the public, and second, that this forethought and business judgment gave to the world the first successful application of the electric motor to the propelling of not only trains, but the heaviest trains; and that, too, at high speed.

A short résumé shows this road to have been

The first: To obtain a charter, February 27, 1827, an instrument that has been a model for succeeding railroad corporations.

The first: To select a Board of Directors, April 23, 1827, and of which the venerable Charles Carroll of Carrollton, the only surviving signer then of the Declaration of Independence, was a member, and who, officiating in his capacity as such, threw the first spadeful of dirt July 4, 1828, the day on which the first stone was laid, saying: "*I consider this among the important acts of my life, second only to that of signing the Declaration of Independence, if second even to that.*"

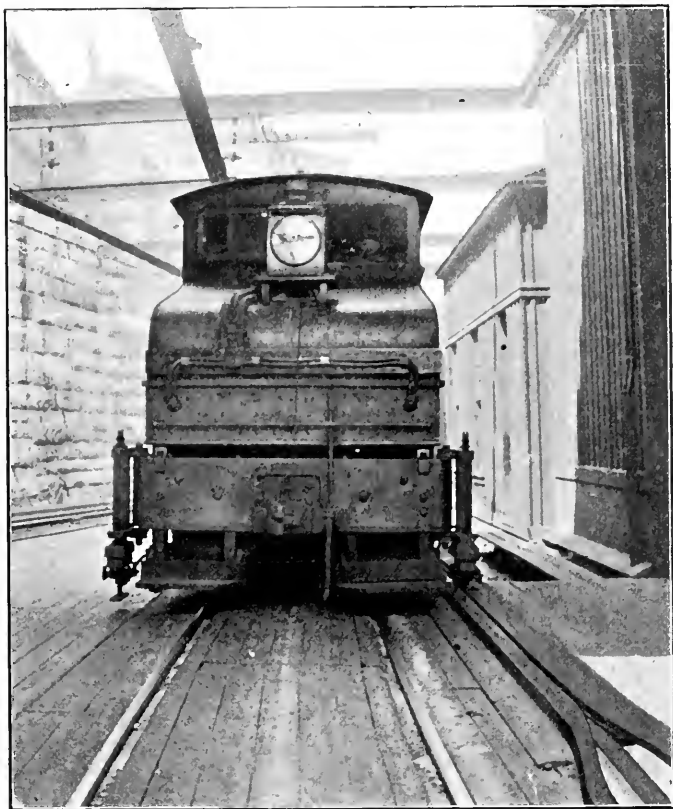
The first: To utilize locomotive power, Peter Cooper having placed the first locomotive ever built in America upon this road.

The first: To employ electricity as a means of communication. It had the first telegraph line in the world, and over which was sent the first message: "What hath God wrought?" At first the simple trolley or overhead method of conducting the electricity was adopted. This has been superseded by what is known as the third rail. This rail is laid through the station at the standard height and on the insulators in the regular way, but it is completely covered over, the conducting shoe being allowed to make contact through a wooden covered slot, supported by iron members from the under side.

The first: To issue a time-table, notifying the people when to be at the stations.

The first: To successfully employ electricity as a motive power, thus demonstrating to the world the entire feasibility of this subtle yet powerful agency in transportation, either for tonnage or speed.

While this road has been first in so many distinctive features, it is peculiarly worthy of the mention of still another fact, that, through all its vicissitudes, it bears without change its original charter name, The Baltimore and Ohio Railroad Company.



The history of this road is a fulfillment of the poet's prophecy:

For I doubt not thro' the ages one increasing purpose runs,
And the minds of men are widened with the process of the suns.

THE SOUTH TERMINAL STATION.

For the past decade all the railroad companies seem to have vied with each other in an effort to furnish the traveling public with the most splendidly equipped and luxuriously furnished stations. There was dedicated December 30, 1898, and opened January 1, 1899, in the city of Boston, what is known as



THE SOUTH TERMINAL STATION.

The ground upon which this station is erected—covered by station buildings alone—is thirteen acres, the entire possessions being thirty-five acres. The front of the main station is an arc of a circle 228 feet; length of the main station 850 feet, maximum width, 725 feet; giving floor area of 506,430 square feet. Total length of building on street front, 3,300 feet. Height from sidewalk to top of eagle, 135 feet; to top of flag pole, 200 feet. Train-

shed: Length, 602 feet; width middle span, 228 feet; area, 137,256 square feet. Train-shed is in three spans, with one sweep. Tracks: Total length fifteen miles; under roof four miles.

THE MIDWAY. The space between the head-house and the train-shed proper, called the midway, is directly over the suburban station, and this area is supported upon steel columns. The floor is 610 feet long and an average of 90 feet broad. This floor has an inclination of one foot between the end of the train-shed and the rear end of the head-house. The midway roof is anchored at the head-house end of each truss, and is supported at the train-shed end by eye-bar hangers directly from the lower chord.

The conditions which governed the architecture of the midway roof were as follows: A flatiron-shaped area with a minimum and maximum width of 50 and 130 feet, respectively; a demand that it should not be high enough to shut out light from the end of the train-shed or from the offices of the head-house; so arranged that light and ventilation should be had from the main waiting room; and without any post-supports in the midway. All the connecting roof trusses are of the riveted-lattice type. The floor of the midway is of marble mosaic; the walls have a high dado of enameled brick and a polished granite base above the dado; the walls are of plaster.

There are three great doorways of polished granite and two verd-antique marble drinking fountains; the room has modeled stucco-coffered ceiling with beams four feet deep.

THE HEAD-HOUSE. The main entrance to the station is at the intersection of Federal Street, Summer Street, and Atlantic Avenue; and it is here that the main architectural features of the station are found and the grand make-up of the whole conception can be judged. The building extends from this entrance 792 feet along Atlantic Avenue and along Summer Street 672 feet, then turning the corner of Dorchester Avenue,

it extends 725 feet farther, making the total street frontage of the head-house 2,189 feet, or nearly one half mile. The five-story building, or main office building, in the middle of which is the main entrance, is 875 feet long; of this 228 feet, or the portion at the main entrance, is curved. In front of the building, opposite the center of the main entrance, there stands an ornamental polished granite column upon a heavy polished granite base, to carry four large electric lights, with sufficient candle-power to light up the entire vicinity of the entrance, affording protection as well as light to passengers. This column is forty feet high.

The women's room is 44 feet by 34 feet, with lounges for the grown-up people, cribs and cradles for the children.

Adjoining the women's room there is a free and a pay lavatory. East of the main entrance, and facing the midway, is the lunch room, 73 feet by 67 feet, with marble mosaic floor and wainscoted with enameled brick. Beyond and in the corner of the lunch room is a stair and elevator hall to the dining room on the second floor. Thus it will be seen that there is here every facility for the anxious as well as for the weary. The waiting room is furnished most comfortably—length 228 feet by 65 feet; seating capacity of dining room and lunch room 500 persons.

The heating with hot water is both direct and indirect—the water is forced around the basement of the buildings through main pipes about three quarters of a mile long, which, with the return, makes a complete circuit, warming about 5,000,000 cubic feet of space.

Neither is it intended to shovel snow from the main roof. All the down-spouts, which are eight inches in diameter, and generally 60 feet apart, are covered with jackets, and steam pipes have been run between the spouts and the jackets to keep them from freezing in even the coldest weather.

The Power Plant buildings are substantial, hard burned brick buildings, with granite trimmings and flat gravel roofs upon steel trusses. They are forty feet wide, two stories high, with an aggregate length of 580 feet.

The other engineering equipments are very elaborate, including not only heating and lighting, but also ice-making and air-compressing apparatus for filtering and cooling the drinking water.

The buildings containing this equipment have been so planned as to obstruct as little as possible the tracks, hence the *tandem* fashion.

For safety, it is claimed that the interlocking and signaling is the most perfect of to-day. Lever movements are said to be daily, 44,264. The number of tracks entering the station, 32; of these 28 are on the main floor, and four in the shape of two loop-tracks on lower floor. Length of tracks under roof, four miles; number of tracks through the throat in yard, 8 for main floor, 4 for lower floor. Total weight of rail, 2,500 tons. Number of double slip-switches, 371, of switches, 252; number of frogs, 283; number of semaphore signals, 150; number of signal lamps, 200; number of levers in towers Nos. 1 and 2, 154. Capacity of tracks in shed, main floor, 282 cars; number on lower floor, loop station, cars, 60; seating capacity for the above cars, 28,104 people. Adding to these express and mail cars, will make a grand total of 613 cars.

Locating tracks upon two floors is a departure from former precedents. The upper is for the main line business—the lower for the suburban travel. The loop avoids much of the switching, and is therefore an economical factor with respect to the element of time.

Some estimate may be formed of the immensity of this plant. It is said that there are twenty-four prominent buildings in the city of Boston, all of which could be enclosed within the grounds covered by this one structure.

THE SOUTH TERMINAL STATION.

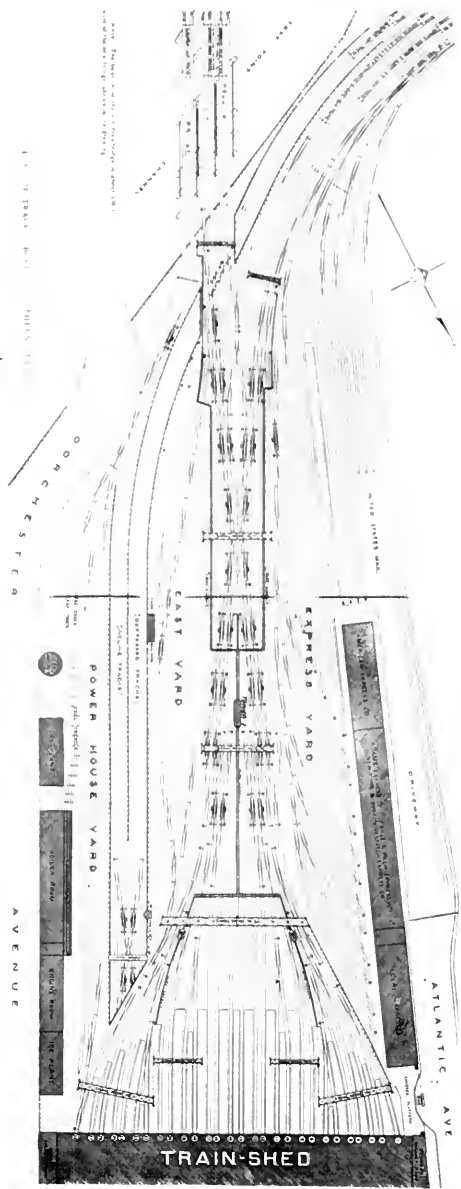


DIAGRAM OF TRACKS.

It was thought at first that the cost would be \$4,000,000. This, however, has been largely exceeded. The work has given employment daily to 1,000 men, and this during the several years of construction; years of "hard times."

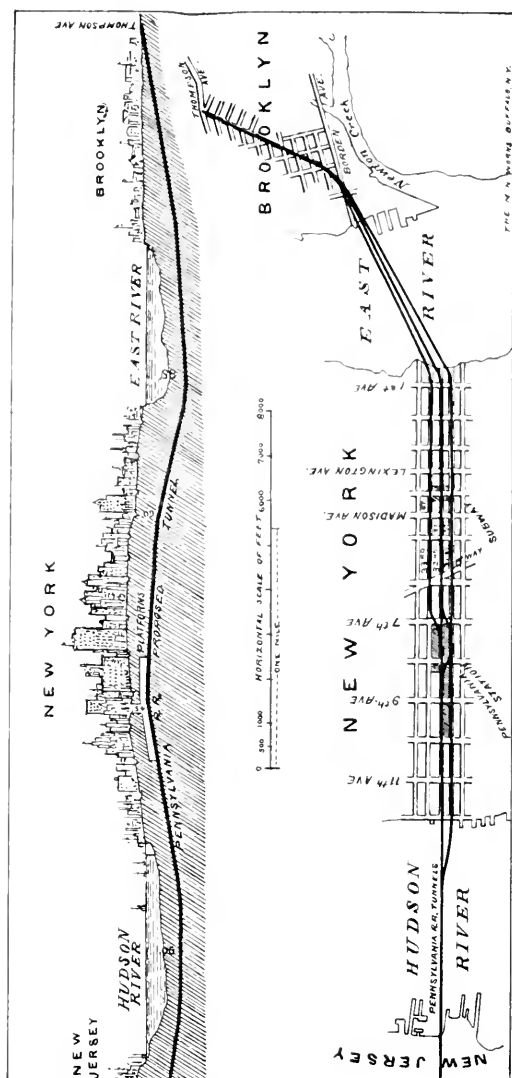
As all railroads must have accurate, standard time, it was thought that the crowning ornament of this station should be a clock whose faces could be seen from all points of the compass; hence in the tower is placed such "*a time-piece*" twelve feet in diameter, with a granite Eagle perched above, eight feet high, eight feet across, ever reminding every patriotic American of the national emblem of his country:

"Our country unrivaled in beauty,
And splendor that can not be told,
How lovely thy hills and thy woodlands
Arrayed in a sunlight of gold;
The Eagle, proud King of the mountain,
Is soaring majestic and free;
Thy rivers and lakes in their grandeur,
Roll on to the arms of the sea."

There is upon the banks of the Cumberland a modest structure, but with all the appliances and conveniences of the most modern station, the Louisville and Nashville, at Nashville.



THE PENNSYLVANIA RAILROAD TERMINAL.



The Scriptures say: "I will pour out my spirit upon all flesh, and your sons and your daughters shall prophesy, your old men shall dream dreams, your young men shall see visions."

It is related that Mr. Austin Corbin, the builder of the Long Island Railroad, dreamed that the little system he was building would become the main line of a great railroad system that would greatly shorten the distance between America and England, Montauk Point and Mel-ford Haven being the terminals. Mr. Corbin, without enjoying the realization of his conception, died, 1896, and it has been left to the "young men," the officials of the Pennsylvania and the Long Island, not only to "see visions," but the realities, and

hence we find, December, 1901, "the Pennsylvania-New York Extension Railroad Company is incorporated with a \$10,000,000 capital." The work will require the expenditure of \$40,000,000, while an addition of over \$10,000,000 more will be invested in electric equipment, power-house, and electric engines. The \$40,000,000 for the work proper will be divided into three items. The Hudson River Tunnel from the ferry approach to the Central Station, in New York city, will cost (estimated) \$20,000,000; the New York city station, located between Seventh and Ninth Avenues and between Thirty-first and Thirty-third streets, including the land, will cost not less than \$10,000,000, while the East River Terminal, from the New York city station to Long Island, will cost \$10,000,000 more.

The Hudson River Tunnel will begin from the new terminal station which the Pennsylvania will build on the 600 acres of the Hackensack Meadows. The line will descend with a grade of $1\frac{1}{2}$ per cent till near the western shore of the Hudson River; the double track here will be split, each line being carried in a separate tube $18\frac{1}{2}$ feet in diameter on the inside and $19\frac{1}{2}$ feet on the outside.

The line of the road continues to descend until midstream, where it will be about 100 feet under the bed of the river. Then it will ascend again with the same inclination to Thirteenth Avenue, about the foot of Thirty-third Street, the line of the road being ten feet below the bed of the river. Continuing to ascend with the same inclination, the line will be forty feet above the bed of the river at Tenth Avenue, and a hundred feet above the river bed and forty feet below the surface of the street at Eighth Avenue.

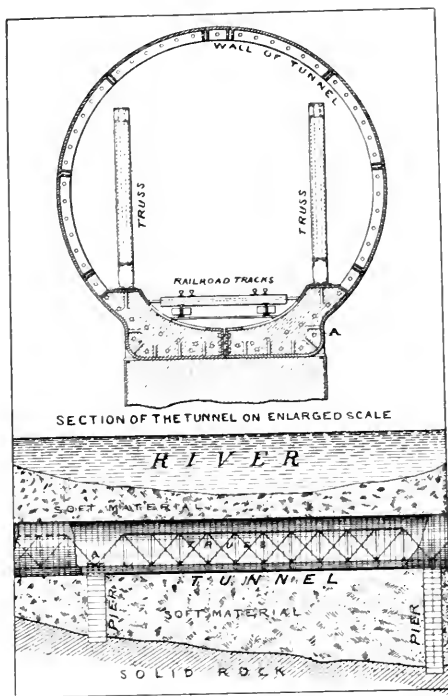
The New York Station will be a magnificent architectural structure, 1,500 feet long and 520 feet wide. This structure will be chiefly four large and symmetrical buildings, nine stories high, covered by steel-turreted arches covered with glass. The station

proper will be located below the level of the street, while peeping above there will be a bridged incline leading to a platform one hundred feet long, where will be access to the waiting room, the elevators, and the stairways leading to the tracks. Near the platform will be located the baggage room, reached by another bridged incline. A carriage-way will extend around the entire building. Entrances and exits for both passengers and carriages will be located at different points, thus avoiding congestion. The waiting room will be located about the center of the station, and below the street surface. The tracks will be on the second floor, below the surface of the street. There will be 25 tracks, with $2\frac{1}{2}$ miles of platform. This will not, however, be a terminal—only a way station, simply a place to load and unload passengers. The trains will continue through to the other end of the station. From Seventh Avenue to Long Island the road will continue a double-track deep tunnel.

On reaching Fourth Avenue another station will be constructed, to be connected with the one already built for the New York Rapid Transit Road. The tunnel will then continue to run under Thirty-third Street and descend toward the western shore of the East River. Here the double track will be split into two single tracks—parallel tubular tunnels of the same dimensions of those to be built under the Hudson River. From the center of the East River the line of the road will ascend again until underneath its eastern shore. Here the two parallel single-track tunnels will join again, and the road will continue in a double-track tunnel to the Long Island Station. Here a change of motive power will be made, and the trains will move on, propelled by steam, to Montauk Point.

Near Montauk Point is a beautiful sheet of water known as Fort Pond Bay. It is deep enough and spacious enough to float the largest steamers. This harbor then is the natural terminus of this tunnel scheme, which is intended to make the Long Island

Railway System merely a link in a vast chain that shall practically reach from the Pacific to and across the Atlantic, closely uniting all America with Europe. The Boston Subway and the New York Transit Railroad afford the most recent and best examples of this mode of construction. They form landmarks along the line of progress in the art of tunneling.



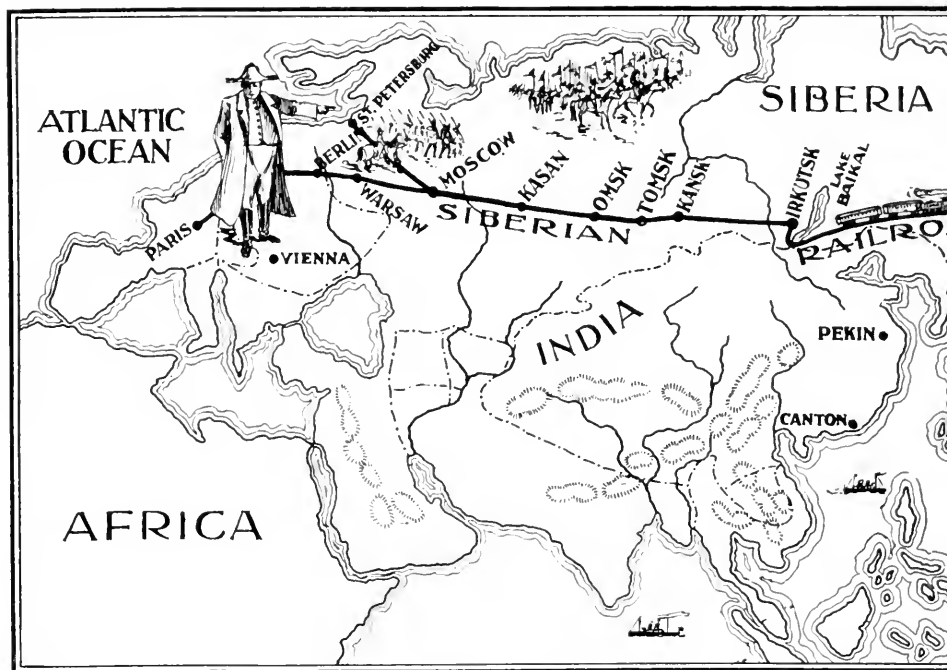
This underground road will be five miles long, and need an excavation of 1,900,000 cubic yards of earth. But on account of the proficiency of the engineering profession of to-day the undertaking will not be more difficult than the driving of any ordinary tunnel built for other railroad purposes.

The great result of this stupendous undertaking will be the gain to the traveling public, to commerce, in the shortening of the ocean voyage, and of the time saved between the Western and Southern cities and the city of New York. The greatest blessing will be the conven-

ience and facility it will give to the dense population, stifled in the city, to enjoy free access to the pure air of the country.

Commercially: The burthen of Austin Corbin's dreams—his visions—his "shibboleth" will be realized:

"ACROSS THE ATLANTIC IN FIVE DAYS."



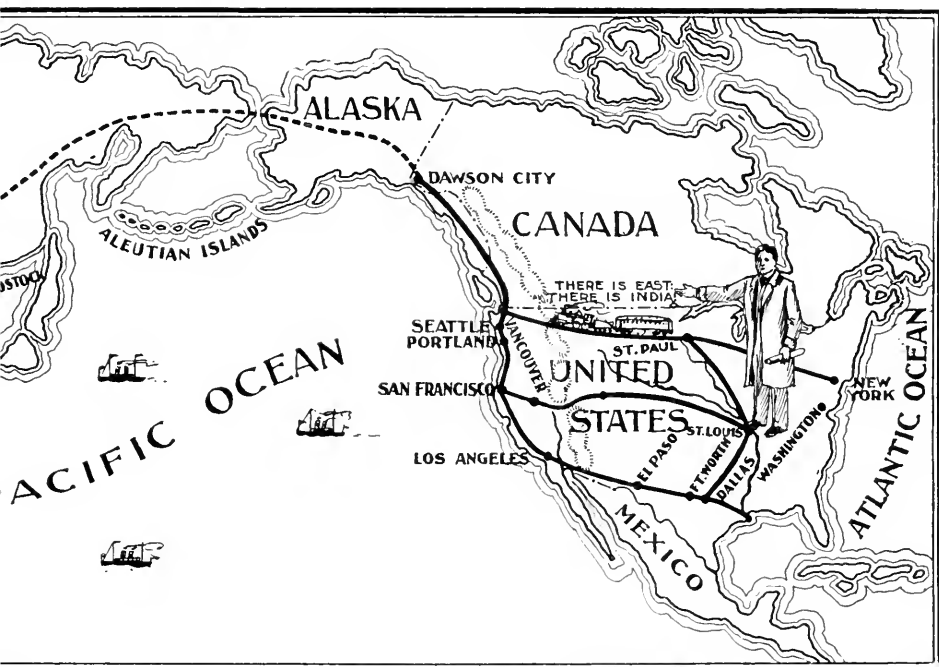
Length of Trans-Siberian Railroad, from St. Petersburg to Vladivostock, 5,785.9 miles; to Port Arthur, 5,903.9 miles.

The longest railroad in the United States, 3,065 miles.

According to M. de Wallant, the Russian Charge d'Affairs, the total cost of the Siberian Railroad, with all its branches and auxiliary undertakings, will be \$390,000,000.*

The tremendous importance of this great railroad, from both commercial and political standpoints, can hardly be overestimated. It promises to establish an avenue of commerce which will change the channels through which trade has flowed for centuries.

*It is but just to state here that a shrewd American engineer named Collins suggested to the White Czar himself the feasibility of this route, and it is said that the present location of the road is practically along the line surveyed by Collins (1857) under the direction of the Russian Government.



It also establishes the power of Russia in all Asia so firmly that a combination of all Europe could hardly make the Bear retreat. It makes it possible by the present circuitous route to circle the globe in thirty-three days, but when the projected lines of America and the resultant lines of Asia, as indicated by the above map, are completed, then this trip will be still shorter.

These railways and the waterway across Bering Strait completed, and we shall have on the one hand the dream of Napoleon verified:

"The Franco-Russo-American Alliance."

But on the other hand, and far beyond this, will be fulfilled Benton's prophecy. The soldiers are Napoleon—War; the trains are Benton—Peace. Nearly one hundred years ago

Napoleon saw in a vision the political complications into which Europe is now drifting, but his dreams were of camps and soldiers—he knew nothing of the peaceful power of steam.

Whatever may be the outcome in regard to our own country when the Siberian Railroad is opened throughout its extent, one thing is certain, it will mean the Russianizing of China, with the loss of trade to England and Japan.

Just fifty-three years ago, Mr. Benton, in a speech in St. Louis, gave utterance to the following:

Let us beseech the National Legislature to build a great road upon the great national line which unites Europe and Asia—the line which will find on our continent the Bay of San Francisco on one end, St. Louis in the middle, and the great national metropolis and emporium at the other, and which shall be adorned with its crowning honor, the colossal statue of the great Columbus, whose design it accomplishes, hewn from a granite mass of a peak of the Rocky Mountains, the mountain itself the pedestal, and the statue a part of the mountain, pointing with outstretched arm to the western horizon, and saying to the flying passengers:

THERE IS EAST; THERE IS INDIA.

A bill has been introduced at Washington to grant a right of way for a railway across Alaska, from Cook's Inlet to Bering Strait.

The Advance Agent of the Railroad.—The Trans-Alaskan Company has established a coach line between St. Michael and Cape Nome which is intended as a forerunner of a railway line which will, if present intentions are carried out, extend to Port Clarence on Bering Strait. The members of the company are California capitalists, who believe that along this route, the greater part of which is practically unexplored, will be found vast deposits of ore.

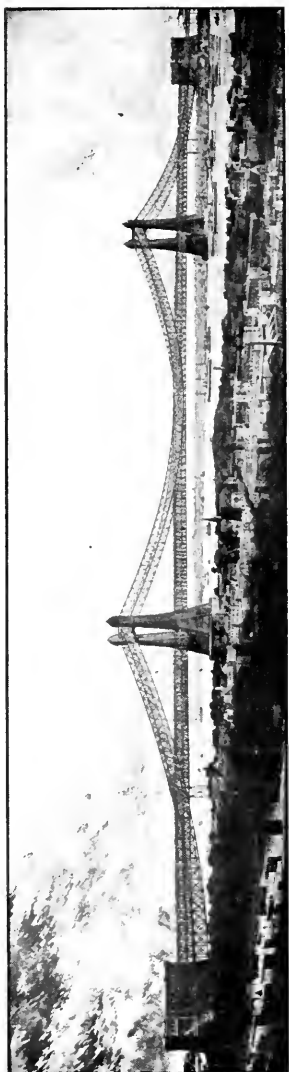


EAST CAPE.

CAPE PRINCE OF WALES.

THE NORTH RIVER BRIDGE.

AS AN ILLUSTRATION OF THE CATENARY CURVE.



This is to be a suspension bridge. Central span, 3,100 feet; end spans, each, 1,850 feet; or the whole will be 6,800 feet—over $1\frac{1}{4}$ miles in length.

The anchorages, with the buildings on top, will be 250 feet high, and the towers 580 feet, or more than twice the height of the Brooklyn Bridge towers.

There are to be eight railroad tracks—these may be increased to fourteen. Its cost, for eight tracks, without right of way, interest, and administration account, will be (estimated) \$21,000,000.

THE STABILITY OF THIS BRIDGE.

It is a practical application of the principle of the catenary curve, the center of gravity being below instead of *above* the points of support. It is demonstrated in the higher mathematics to be the curve



The Catenary Curve

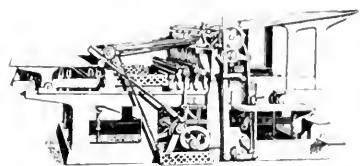
of greatest stability, and inverted forms the arch of greatest resistance.

Mr. Jefferson, a man wiser than his generation, seemed to understand the superior merits of this curve:

To say another word of the catenarian arch . . . Its nature proves it to be in equilibrio in every point.—*Jefferson Correspondence.*

THE PRESS, THE SCHOOL, THE RAILROAD.

The three great factors of modern civilization are the Printing Press, the Public School, and the Railroad. "The newspaper fur-



nishes the matter, the public school prepares the reader, and the railroad carries the printed page to every hamlet, town, and city. The newspaper furnishes a daily exhibit of the

important doings of all nations. This brings about a perpetual education on the part of each citizen, and throughout his life he learns every day better the methods which explain human beings, over the whole to each person a village on a to the daily thereby moves city. The rail-



the great function of connecting the rural population with the city population—the union of the city and the country is the product of the railroad." Hence the printing press, the public school, and the railroad may be considered at least as the *trinity of American civilization*.



The late President, William McKinley, said "Commerce follows the Flag." The course, however, in these matters is changed: The Flag follows the Schoolhouse, the Printing Press, and the Railroad.

THE PIONEER SCHOOL LASELL SEMINARY.

FOR YOUNG WOMEN.

AUBURNDALE, MASS. (WITHIN TEN MILES OF BOSTON.)



THE MAIN ENTRANCE.

AIMS.—We aim to continue through the years spent at school the influence of refined Christian association and oversight, and to make the "atmosphere of culture" conducive to the training of girls for their distinctive duties in home life.

ENGLISH LANGUAGE.—While maintaining a thorough classical course for pupils desiring it, and sending representatives to the best colleges open to women, our own regular course emphasizes the study of the English language and literature, history, and natural science, with the emphasis on their help in home life.

THE ART OF EXPRESSION.—General lectures and careful individual training are given in the Art of Expression. Many a woman fails through some inaptness of manner, of speech or movement, or through some hindering

self-consciousness or self-distrust, to reach that position of influence to which her intellectual capacity and excellence of character entitle her; while many another of simpler gifts multiplies her power by the winsomeness of attractive presence. Other things being equal, this rare quality of restful, inspiring presence is the charm of domestic and social life.

We have teachers of the first rank for various branches of Music and native instructors for French and German.

COOKING AND DRESS-CUTTING.—Thorough instruction is given in cooking, dress-cutting, millinery, and other domestic arts, the new building having lecture and work rooms especially fitted up for this purpose. In this first attempt to teach practical housekeeping, it has been clearly demonstrated that domestic science can go hand-in-hand with other branches of education. This practice-work is supplemented by two courses of lectures on "Science Applied to Housekeeping." The course of lessons on invalid cookery is very popular. The work takes the place of the daily-prescribed physical exercise, and seems a perfect antidote for nervous prostration. The regular line of studies is in no way interfered with.

A young lady, a former graduate, writes: "I feel that the Experimental Housekeeping has given us a very valuable bit of *practical* experience. One can not really understand the work about a kitchen until one actually does that work herself. Even if we should never again be obliged to do that work ourselves, the better understanding of how to direct others in a systematic way will be in itself invaluable."

Another says: "Experiment Hall is, in my estimation, an assured success in its practical usefulness. It is, I firmly believe, one of the best of the advantages offered by Lasell to its students. By means of this course I have learned more about cooking and housekeeping than I ever could have learned in other ways. The systematic arrangement of all the work, and the training it gives in the art of managing, makes it especially useful to the student after school days are over, for one does not easily forget what has been acquired by actual practice in any art. I should advise every one who can, to take advantage of this excellent opportunity of learning the art of good housekeeping in this most effectual, practical and satisfactory way."

COMMON LAW AND SANITATION.—Lectures on common law are given by an eminent Boston lawyer, and on home sanitation by a lady well known in Boston educational circles. In these two branches, also, Lasell led all schools.

SPECIAL PHYSICAL CULTURE.—Daily physical exercise, prescribed for individual needs as ascertained by careful measurement and tests of strength, is expected of all pupils, both as a condition of health and of that physical poise and self-possession which constitutes so large an element of the best social success.

THE GYMNASIUM.—The Gymnasium was furnished under the direction of Dr. Sargent, of Cambridge, and has the supervision of a lady who is a graduate from his training-school for teachers. The health of students is considered of the first importance; and all the arrangements of the Seminary are made with the end in view that those educated in it become well-developed, vigorous, and graceful women. Abundant time is given for open-air exercise. The pleasant, spacious grounds afford ample room for out-door sports.

BOATING.—It is a regular pastime when the weather permits. The School has several boats upon Charles River for the free use of the students.

SWIMMING.—This is taught in a tank where the water is kept warm, winter and summer—this is very popular. One of these students rescued two of her mates from certain drowning while on a vacation visit to their home.

MILITARY DRILL.—During the last ten years military drill has been allowed as a substitute twice a week for the gymnastic exercise. The purpose is to make the pupils more *erect*, to aid in acquiring a good carriage, and to train to instant obedience. The results have equaled our expectations.

EXCURSIONS.—Our vicinity to Boston affords also abundant opportunity for pleasant and profitable excursions, eagerly utilized by us.

DRESS.—The dress of pupils must be simple and inexpensive.

To secure place, application must be made early, as many are refused for lack of room. For illustrated catalogue address,

C. C. BRAGDON.

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